COMMONWEALTH AGRICULTURAL BUREAUX

Change of title

On 1st January, 1948, The Commonwealth Agricultural Bureaux became the title of the central organization and The Commonwealth Bureau of Horticulture and Plantation Crops the title of this bureau.

HORTICULTURAL ABSTRACTS

Subject matter of abstracts

Horticultural Abstracts, first published in 1931, is the quarterly journal of the Commonwealth Bureau of Horticulture and Plantation Crops, the main purpose of which is to make known throughout the British Commonwealth the progress of research in those subjects. The abstracts are prepared from current literature published in every part of the world in many languages.

The bureau's primary concern is with horticultural and plantation crops and the application of science to them, but it deals also with two allied field crops, potatoes and tobacco, and with many minor crops difficult to classify.

For the purposes of this journal horticultural crops include all those whose products normally appear as fruits, vegetables, nuts and flowers, while all tropical and sub-tropical perennials, such as tea, rubber, oil palm, etc., are considered to be plantation crops.

The storage and preservation of the products from the above crops are covered, but not the highly technical details of some of the processes concerned.

Change in cover and list of contents

The aim of the change in cover is to display the title more effectively and to give some clue to the contents of the journal.

The somewhat fuller list of contents should facilitate quick reference to particular subjects.

Journals on closely related subjects

Plant Breeding Abstracts, Herbage Abstracts and Field Crop Abstracts, all issued by the C.A.B., deal respectively with the breeding of annual and perennial crops, with herbage problems and with field crops.

HORTICULTURAL ABSTRACTS

Vol. XVIII March 1948 No. 1

Initialled reviews are by G. Bond of the University of Glasgow, J. K. Eaton of East Malling Research Station, G. K. G. Campbell and G. St. C. Feilden.

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MISCELLANEOUS.

General.

1. NATURAL RESOURCES SECTION GHQ, S.C.A.P. 63(072)(52)

The Agricultural Experiment Stations of Japan. *Rep. British Intelligence Objectives Sub-Committee B.I.O.S./J.A.P./P.R./***1554,** 1946, H.M. Stationery Office, Lond., pp. 92, mimeographed.

In relation to area of cultivated land and agricultural income, Japan has one of the most extensive systems of agricultural research in the world. The agricultural experiment stations are relatively small and numerous. This appears to be due to a tendency to establish small independent stations with limited responsibilities instead of large stations with multiple duties. Also a wide diversity of climate makes it desirable to have many stations to serve relatively small areas. In general the Imperial experiment stations devote their main effort to the discovery of basic principles and the solution of problems of national importance. The Prefectural stations generally centre their attention on local problems with emphasis on results of immediate practical value. Co-ordination of effort appears to be good, and little unnecessary or undesirable duplication of work occurs between the Imperial and the Prefectural stations. A few of the more

important achievements of practical value of the agricultural experiment stations include the creation of new and superior races or varieties of silkworms and rice, new methods of caring for and rearing silkworms, marked decreases in the cost of harvesting tea leaves and in curing them, and diseases and insect pest control. Few important plant diseases exist in Japan for which effective methods have not been devised, largely as a result of research. An outstanding development of research is the use of F_1 hybrid silkworms for the production of silk. The increase in food production as a result of breeding better food crops and improving manuring practices is very marked. [From summary.]

2. Food and Agriculture Organization of the United Nations. 634/635
Study group on horticultural matters.
Food and Agric., 1947, **1**: 50.

The Temporary European Bureau of F.A.O. invited a small group of experts to form a study group to examine certain matters relating to horticulture. This group met at The Hague in May 1947, when it was decided to limit the field of study to a few important problems relating to fruits and vegetables, including production, consumption and available supplies in Europe. The group was of the opinion that F.A.O. should publish, periodically, reports on European crops, as well as information on the control of plant diseases and on scientific improvements in horticulture.

3. Anon. 63: 551.5
Meetings of technical commissions of the International Meteorological Organization in Toronto, Canada.
Weather, 1947, **2**: 309-13.

The Commission on Agricultural Meteorology proposes to investigate problems of phenology ; artificial weather and climate (greenhouses, windbreaks, etc.); agricultural microclimate; ecology, forests and soil-erosion; plant diseases and insect plagues, including their commercial and industrial aspects; assessment of crops and condition of plants; bibliography and publications; and the forecasting and presentation of agro-meteorological data.

4. Frankel, O. H. 581.9: 91.041
Plant collections.
J. Aust. Inst. agric. Sci., 1947, **13**: 122-4, bibl. 3.

A brief survey of the subject from the standpoint of general objectives and lines of approach. Proposals are made based on international co-operation and the establishment of central collections of one or more crops in different countries. Each participating country would undertake to look after a central collection of one or more crops and to make available material and information to all other countries and institutes participating in the scheme. Reference is made to the report of Lord Hankey's committee and to the recommendations of the Imperial Agricultural Bureaux Conference, 1946.

5. Rickett, H. W. 58.006(72)
The royal botanical expedition to New Spain 1788-1820.
Chron. Bot., 1947, Vol. **11**, No. 1, pp. 1-85, illus., bibl. 33, $2.50.

A vivid account of the expedition promoted by His Catholic Majesty Charles III of Spain to Mexico with particular reference to the establishment of a Botanic Garden in the capital and the parts played in the expedition by Sessé (Don Martin de Sessé y Lacasta) and Mociña (José Mariano Moziño Suares Losada).

6. Arietti, N. 581.9(453)
La flora della Valle Camonica. **(The flora of the Camonica Valley** [in N.E. Italy].
Att. Ist. bot. R. Univ. Pavia, 1944, Ser. 5, **4**: 1-181 [received 1947].

A critical revision of unedited notes by Penzig. The flora contains very many plants of horticultural interest. It is well indexed.

7. Oppenheimer, H. R. 581.522.4(569.4)
Natural reproduction of exotic plants in Palestine.
Palestine J. Bot. (*R*), 1947, **6**: 4-19.

While introduced species of annual plants often sprout easily from seeds during the rainy season, perennial exotic species are rarely found reproducing from seeds.

8. Ipatjev, A. N. 631.521
Evidence of order in the composition and structure of the population of a variety. [Russian.]
Proc. Kirov agric. Inst. Omsk, 1939, Vol. **4** (17), pp. 109-26 [received 1947].

After studying quantitatively the population of plants composing varieties of many vegetable crops, the conclusion is reached that no variety can be homogeneous. Every population consists of the essential type, or central race, as the author calls it. This is always accompanied by a race, or races, of plants which are genetically close to it, and an admixture of other races the occurrence of which is more fortuitous, and which can be for the most part removed by selection. Attempts by means of selection, to separate either the essential type, or its invariable companion, from the other constituents of the population never can do more than increase its proportion in the whole; the other constituents respond to the selection by emerging in spite of it, so that the population always assumes the form described above.

9. Bond, T. E. T. 519
Some Ceylon examples of the logarithmic series and the index of diversity of plant and animal populations.
Ceylon J. Sci., 1947, **12**: 195-202, bibl. 10.

The purpose of this communication is to draw attention to a new theory of the " hollow curve " originally propounded as part of Willis's " Age and Area " hypothesis. Examples of the modified " hollow curve " are furnished from the genera and species of a section of the Ceylon flora, and from recent lists of the Ceylon birds, butterflies and mammals. The new theory involves the concept of the " index of diversity " as controlling the relationship between the number of species in a population and its size. This is illustrated by a consideration of the weed flora of a manurial experiment with tea on St. Coombs estate. An apparent discrepancy between the observed and calculated densities of individual plants per unit area is attributed to a peculiarity in botanical composition of the flora as affected by the system of weeding. [Author's summary.]

10. Ruys, J. D., and van Dijk, W. 582
De plantennomenclatuur in de tuinbouw. **(Plant nomenclature in horticulture.)**
Meded. Direct. Tuinb., 1947, **10**: 289.

A discussion of the rules of botanical nomenclature in their interpretation as applied to horticulture, with reference to the recommendations laid down by the horticultural congresses of London (1930), Paris (1932), Rome (1935) and Berlin (1938).

11. Matuszewski, T. 576.8
Wstep do microbiologii rolniczej. **(Introduction to Agricultural Microbiology.)**
Biblioteka Puławska **23**, 1947, pp. xvi+243, references to 51 authors.

This publication of the State Institute of Agricultural Science at Pulawy consists of Part I, General, with chapters on (1) Micro-organisms in nature, (2) Outline of the morphology of micro-organisms, (3) Micro-organisms as a population, (4) The influence of environment on the organism, (5) Biochemistry of micro-organisms, and Part II, Special, (6) Anaerobic fermentation of carbohydrates, (7) Other metabolic changes of substances containing carbon, hydrogen and oxygen, (8) Metabolism of nitrogenous substances, (9) Metabolism of mineral substances, (10) Introduction to

methods of study. There are 32 figures in the text, 26 tables and 13 graphs.

*Physiology.**

12. CONARD, A. 581.11
Les mouvements des fluides dans les végétaux. **(The movement of fluids in plants.)** [English summary pp. 8.]
Trav. Jard. exp. Jean Massart, Brussels,† 1947, pp. 48.

Movements of air and liquids in plants are co-ordinated. Cytoplasmic [intra-utriculaire] pressure, resulting from photosynthesis, compresses the cell vacuole, expelling water from it through the cytoplasm. The more readily diffusible assimilates [protoplasme indifférencie fluide] pass into the vacuole, raising its osmotic pressure. The vacuolar pressure compresses the cytoplasm, driving assimilates out of the cell through the plasmodesmae; these connect all the cytoplasm of the plant. The resultant " vegetative pressure ", aided by transpiration and the withdrawal of assimilates for growth or reserve, is responsible for all movements of air, water, and solutes through the plant. Outside the cambium, phloem cells are differentiated with more and bigger plasmodesmae; within, xylem vessels are differentiated by the disappearance of cytoplasm, plasmodesmae and transverse walls. The older xylem vessels form a water reservoir, filled by night and emptied during the day through the medullary rays; air is displaced in this process. The withdrawal of water from the soil depends on active growth of the root tip.

13. HARDER, R., AND MEYER, G.
577.17: 612.014.44
Langtagsblätter als Bildungsort für formbeeinflüssende Stoffe bei Kalanchoë und Sedum. **(The formation in leaves exposed to long days of substances influencing the form of *Kalanchoë* and *Sedum* plants.)**
Nachr. Akad. Wissensch. Göttingen, Math.-Phys. Klasse, 1945, pp. 60-3, bibl. 5 [received 1948].

Long day plants of *Sedum kamtschaticum* were decapitated and transferred to short day conditions. When only one of the top leaves was exposed to long day conditions in its axil the new shoot developed long day characters (leaves large, cuneate and dentate; internodes long). Short day plants behaved in the same way. When only one of four upper leaves was exposed to long day conditions, shoots intermediate in form developed in the axils of the adjacent leaves. These experiments with *S. kamtschaticum*, a plant that flowers in response to long days, show that its long-day substance is more potent than its short-day substance. In *Kalanchoë blossfeldiana*, a short day plant, the short-day substance, metaplasin, is more potent than the long-day substance. The factors influencing the shape of the leaves are undoubtedly mobile chemical growth substances.

Propagation.‡

14. SHERWOOD, C. E. 631.544
An improved greenhouse bench.
Quart. Bull. Mich. agric. Exp. Stat., 1947, **29**: 316-19, bibl. 5.

The Michigan State concrete bench is cast in sections 2 ft. long by 4 ft. wide, 6 in. deep at the sides and 7 in. at the centre. No reinforcement is used. Sections are cemented together and coated with asphalt emulsion; every fifth section has a hole for drainage or sub-irrigation. The bench is supported by 4×6×16 in. legs on a 4×6 in. foundation.

15. GOOSSENS, H. C. W. 631.544
Het oliestoken in de tuinbouwbedrijven. **(The use of oil fuel in horticulture.)**
Meded. Direct. Tuinb., 1947, **10**: 233-42.

A discussion of the advantages and disadvantages of fuel oil combustion for heating greenhouses, with illustrations of certain types of heater.

16. O'ROURKE, F. L., AND MOULTON, J. E.
632.95: 631.544
The use of new-type atomizers in the propagation greenhouse.
Quart. Bull. Mich. agric. Exp. Stat., 1947, **30**: 92-5, bibl. 3.

This simple atomizer was described by C. L. Hamner and H. B. Tukey (*Science*, 1947, 105: 104-5; *H.A.*, 17: 727), who used it for the application of 2,4-D. Using an air pressure of 5 lb. or more each nozzle can atomize from one to twelve gallons of water hourly; clogging is less frequent in these nozzles than in other types, and a high humidity can be maintained in the greenhouse.

17. STOUTEMYER, V. T., AND CLOSE, A. W.
631.535: 612.014.44
Changes of rooting response in cuttings following exposure of the stock plants to light of different qualities.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 392-4, bibl. 1.

An account of changes in rooting of cuttings of *Gordonia axillaris* resulting from differences in light exposure of the parent plant. Roughly it may be said that cuttings from greenhouse grown plants and from plants subjected to daylight tube lighting showed excessive callus and little rooting, those from plants under blue and pink tube lighting showed moderate callus and fair rooting; those from plants under blue tubes little callus and heavy rooting and those from plants under " E " phosphor General Electric sunlamps little callus and fair rooting. The treatment of the parent plants continued from 6 December to 14 January. Similar tests with *Salvia splendens* were inconclusive. Tests with cuttings, partially lignified, of *Cinchona ledgeriana* showed heavier rooting in the lots under blue fluorescent tubes.—Glenn Dale, Md.

18. HOUSTON, R., AND CHADWICK, L. C. 631.535
Some results of the effect of controlled humidity, mediums, and watering methods on the rooting of cuttings of some deciduous and evergreen plants.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 410-16, bibl. 9.

The authors, who give a diagram of their system of controlling humidity in media used for propagation by cuttings, tabulate the results achieved under conditions of so-called manual sub-irrigation, constant level sub-irrigation and overhead watering in two types of silica sand and in vermiculite with softwood cuttings of some 20 ornamental or shrubby plants. They describe in more detail similar trials with cuttings of greenhouse roses and *Taxus cuspidata*. —Columbus, Ohio.

19. STOUTEMYER, V. T., AND CLOSE, A. W.
631.53: 612.014.44
Plant propagation under fluorescent lamps.
(*Unnumbered Pap.*) *Bur. Plant Industry, Soils and Agricultural Engineering, U.S.D.A.*, 1946, pp. 5.

A closed propagating case is described, in which light is provided by one or two 40-watt fluorescent lamps. Its dimensions are 6 ft. by 3 ft. by 2-3 ft., and to avoid condensation and loss of heat it is made of waterproof composition board. Vermiculite [see *H.A.*, 17: 1949] is used for rooting cuttings. *Temperature.*—This should be kept at about 70° F.; some tropical plants need higher temperatures; dormant cuttings should be started with less heat. Bottom heat may be supplied by an electric heater in a

* See also 96-100.
† 1850 Chaussée de Wavre, Auderghem-Bruxelles.
‡ See also 68-88.

6-in. false bottom. *Light.*—80 to 200 ft. candles of red or white light is adequate for rooting; the lamps should be at least a foot above the cuttings. *Seed germination.*—Sphagnum moss or vermiculite may be used; nutrient solution must be added unless the seedlings are transplanted to soil soon after germination. *Light.*—500-800 f.c. should be provided for 16 hours daily by raising the seedlings to within a foot of the lamps; daylight, soft white, and 3,500° white lamps have been used.—Beltsville, Md.

20. STUART, N. W. 631.53
Expanded vermiculite useful for soilless culture, germinating seeds and rooting cuttings.
Flor. Rev., 19 September, 1946, pp. 1½.
MCCANN, L. P., AND STUART, N. W.
The growth of column stocks (*Matthiola*) in sub-irrigated concrete greenhouse benches containing expanded vermiculite.
ibid., 17 April, 1947, pp. 2.

In the United States heat-expanded vermiculite is sold as "Terra-Lite" in four grades based on particle size. Its advantages are sterility, lightness, good aerating and water supplying properties. The second paper describes the cultivation of stocks for seed production.—Beltsville, Md.

21. HSIUNG, T. H. 631.535
Effects of length of cutting and number of leaves on root formation. [Chinese.]
J. Agric. Ass. China, Suppl. No. 50, Abstracts of papers, 25th Annual Meeting, 1945, pp. 17-18.

Experiments were made in 1942-3 using *Euonymus japonica* as material. Cuttings were made of different lengths (13, 8 and 5 cm.), and with different numbers of leaves (2, 4 or 6). Cuttings of any length could give 100% rooting. The 5 cm. cuttings gave the most and the longest roots. Number of leaves appears to be directly proportional to the percentage of cuttings rooted and inversely to the number of roots. Thus the 6-leaf cuttings gave the highest percentage rooting, but the lowest number of roots. The reverse was shown by the 2-leaf cuttings. Length of roots showed no significant differences.

22. HSIUNG, T. H. 631.535
Rooting response as influenced by the nature of the basal cut. [Chinese.]
J. Agric. Ass. China, Suppl. No. 50, Abstracts of papers, 25th Annual Meeting, 1945, p. 18.

Four different methods of making the basal cut of cuttings were studied, using, (1) the slant cut, (2) the horizontal cut, (3) slit cuttings, and (4) heel cuttings. Four test plants were used, *Euonymus japonica*, *Punica granatum*, *Lagerstroemia indica*, and *Spiraea prunifolia*. The experiment lasted two years. The results for *Euonymus* were, 78·5% rooted in the case of horizontal cut (both the soft and the hard wood cuttings), 72·1% in heel cuttings, 66·4% in slit cuttings, and 56·4% in slant cuttings. For the other 3 plants the slit method gave the best results.

*Growth substances.**

23. VAN STUIVENBERG, J. H. M. 577.17
Plant growth substances: some recent applications and further possibilities.
Food and Agric., 1947, **1**: 92-6.

The following applications are mentioned: stimulation of rooting in cuttings, the prevention of pre-harvest drop of fruit, the inhibition of sprouting in ware potatoes, inducing parthenocarpy in tomatoes and holly, and killing of weeds. Some further possibilities are: retardation of flower-opening until danger from frost has passed, and the stimulation of ripening in fruit.

* See also 70, 132-139, 315-326, 368-371, 389, 426, 475, 513, 543, 600, 643, 708.

24. SCHOLZ, J. 577.17
Využití vzrustových latek v zahradnictvi. (**The use of growth substances in horticulture.**) [German summary ⅛ p.]
Věstnik České Acad. zeměděl., 1942, **18**: 274-80, bibl. 34 [received 1947].

A review of the use that has been made of growth substances in horticultural practice, with reference to stimulating growth and fruit development, the healing of wounds and inducing rooting, increasing the yield in vegetables, preventing the early drop of fruit, and, in ornamental plants particularly, rooting of cuttings.

25. TINCKER, M. A. H. 577.17
Chemical regulators of plant growth.
Research, 1947, **1**: 11-18, bibl. 41.

A general account of present-day knowledge of the following aspects: propagation, parthenocarpy, pre-harvest drop, bud retardation, weed killers.

26. MAXIMOV, N. A., TURESKAYA, R. KH., AND MUKHINA, M. F. 635.652: 577.17
Tests of the physiological activity of certain new growth substances.
C.R. Acad. Sci. U.R.S.S., 1947, **55**: 655-8, bibl. 9.

It is shown that dichlorophenoxy compounds, which are more accessible and more easily prepared than the indole derivatives, may be used for stimulating root development in cuttings of kidney beans.

27. LARSEN, P. 577.17
Avena curvatures produced by mixtures of growth promoting and growth retarding substances.
Amer. J. Bot., 1947, **34**: 349-55, bibl. 32.

The inhibitor used for 3-indole acetaldehyde was an ether extract from tomatoes. Parasorbic acid and anemonin inhibited the action of 3-indoleacetic acid.—University of Copenhagen.

28. PRIDHAM, A. M. S. 577.17: 631.535
The effect of 2,4-D on root induction.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 359-62, bibl. 1.

Trials at Ithaca with cuttings of *Coleus blumei*, *Ilex* spp., *Ligustrum vulgare*, *Taxus* spp. and various chemicals showed that 2,4-D over a concentration range of 2·5 p.p.m. to 750 p.p.m. has the same ability to induce root formation as indolebutyric acid.

29. READY, D., AND GRANT, V. Q. 577.17
A rapid sensitive method for determination of low concentrations of 2,4-dichlorophenoxyacetic acid in aqueous solution.
Bot. Gaz., 1947, **109**: 39-44, bibl. 4.

A simple and rapid quantitative method for the determination of small amounts of 2,4-dichlorophenoxyacetic acid (2,4-D) in aqueous solution is described. This method is based on the activity of the acid in inhibiting the growth of the primary root and shoot of germinating cucumber seed. It is sensitive to 0·005 p.p.m., and is applicable from this concentration to 5·0 p.p.m. Initial surface sterilization of the seed, selection of pregerminated seed of certain root lengths, and special equipment are not necessary. [Authors' summary.]

30. MURRAY, M. A., AND WHITING, A. G. 635.65: 577.17
A comparison of the effectiveness of 2,4-dichlorophenoxyacetic acid and four of its salts in inducing histological responses in bean plants.
Bot. Gaz., 1947, **109**: 13-39, bibl. 11, being *Contr. Hull Bot. Lab.* **586**.

Young kidney bean plants were decapitated in the second internode. 2,4-D or one of four of its salts (NH_4, Cu, Ca, or Mg) was applied to the cut surface in lanolin at a concentration of 0·5%. In each case the tumour induced by

treatment consisted of a lowest zone of limited proliferation, a zone of root formation, and above this a zone of major proliferation. With 2,4-D and its NH_4 and Cu salts there was also an uppermost zone of limited proliferation. The effectiveness of the growth-regulating substance is considerably reduced according to the kind of salt of 2,4-D in which it is applied.—University of Chicago.

31. RHODES, A., AND TEMPLEMAN, W. G. 577.17
Effect of 4-chloro-2-methyl phenoxyacetic acid on the mineral content and growth of plants.
Nature, 1947, **160**: 825-6, bibl. 1.

The sodium salt of 4-chloro-2-methyl phenoxyacetic acid markedly interferes with the potassium metabolism of the most susceptible species tested, rape. In corn chamomile morphological changes were induced by treatment, but potassium balance was not upset.—Jealott's Hill Research Station.

32. TUMANOV, I. I., AND LEZANDR, A. A. 577.17
The physiological action of triiodbenzoic acid on plants. [Russian, with English summary 1 p.]
J. Bot. U.R.S.S., 1946, **31**: 13-21, bibl. 6.

The physiological action of triiodbenzoic acid upon various plants (including *Perilla nankenensis* and peas), and under various conditions has been studied under glass. Different plants showed different sensitivity. Applications (0·025% on each of 6 days followed by 0·005% for 8 days) on *Perilla* markedly retarded growth without any morphological changes. Pea seeds were very sensitive to the treatment; a concentration of 0·01% increased branching and induced development of all axial buds and fusion of leaflets.

*Technique.**

33. FELBER, I. M. 631.8: 631.589
Direct introduction of chemical substances into herbaceous plants.
Science, 1947, **106**: 251, bibl. 5, illus.

A description of the so-called thread method, used by W. O. Roberts (H. A. 17: 636) and "developed independently by the author". "This method seems to be useful in cases where (1) specific areas of a plant cannot be reached by applying a drop, (2) minimum amounts of a substance are to be introduced, and (3) the capacity of specific tissues is to be tested relative to absorption, accumulation, or transport of metabolic or artificially introduced substances."—Michigan State College.

34. JOHNSON, L. P. V. 631.531
Embryonic reaction to sodium biselenite as a test of seed vitality.
J. Amer. Soc. Agron., 1947, **39**: 943-7, bibl. 8.

A modification of the sodium biselenite test was satisfactory for seeds of many crops. Instead of soaking the seeds in water for 24 hours before the chemical treatment, they were soaked for 16 hours, then aerated for 8 hours.

35. CHAUMIER, P. 631.588.1: 634/635
Les applications de l'électricité en horticulture. **(Electricity† in horticulture.)**
Jardins de France, 1947, **1**: 148-9, 163-5.

Electricity may be used by the horticulturist in many ways. Light may be used to control flowering, or to improve the growth of seedlings and the rooting of cuttings in winter. Soil may be warmed electrically. Electric power may be used for pumping water, refrigeration, cultivation, transport, and for running various machines for washing and grading produce.

* See also 192-194.
† See also 329, 340.

36. CREEK, C. R., HAUCK, J. F., AND HURLBURT, V. L. 634.993 + 631.61
Clearing and improvement of farm land in Massachusetts.
Bull. Mass. agric. Exp. Stat. **439**, 1947, pp. 31.

Methods and costs of clearing land are examined and the various types of equipment used described and illustrated. The economics of clearing and improvement are discussed and conclusions drawn.

37. WAKELEY, J. T., AND RIGNEY, J. A. 551.5
The use of frequency distributions of weather factors in agronomic practices.
J. amer. Soc. Agron., 1947, **39**: 1088-93, being *J. Pap. N.C. agric. Exp. Stat.* **267**.

Examples are given of frequency distributions of weather factors important in agriculture, e.g. seasonal frequency of days with more, or less, than a specified rainfall, or temperature. Records may be punched on cards and sorted mechanically to give the distributions.

Noted.

38.

a BRINK, R. A., AND COOPER, D. C. 581.142
The endosperm in seed development.
Bot. Rev., 1947, **13**: 423-541, bibl. 283.
Embryo culture is also reviewed.

b CARTER, G. J. 631.544: 631.588.1
Electric hotbeds prove their worth [in Canada].
Canad. Gr, 1947, **70**: 11: 10-12.

c GIACOMINI, V., AND ARIETTI, N. 581.9(452)
Studi sulla flora e vegetazione delle prealpi Lombarde. **(Studies of flora and plant growth on the lower slopes of the mountains of Lombardy.)**
Att. Ist. bot. R. Univ. Pavia, 1943, Ser. 5, **2**: 1-119, bibl. 201 [received 1947].

d JAMES, W. O. 581.12
The respiration of plants.
Ann. Rev. Biochem., 1946, **15**: 417-34, bibl. 158.

e LUNDEGÅRDH, H. 631.8
Mineral nutrition of plants.
Ann. Rev. Biochem., 1947, **16**: 503-28, bibl. 139.

f (MERRILL, E. D.) 58: 63
Merrilleana—a selection from the general writings of E. D. Merrill.
Chron. Bot., 1946, Vol. **10**, Number 3/4, pp. 127-394.

g PEAT, S. 581.192
Plant carbohydrates.
Ann. Rev. Biochem., 1946, **15**: 75-92, bibl. 74.

h RICHES, J. P. R. 631.811.9
Preliminary experiments on the use of synthetic resins in the estimation of trace elements.
Chem. Industr., 1947, **43**: 656-8, bibl. 14.
In plant materials.

i SKOOG, F. 577.17
Growth substances in higher plants.
Ann. Rev. Biochem., 1947, **16**: 529-64, bibl. 254.

j SMITH, J. H. C. 581.17
Organic compounds of magnesium and phosphorus in relation to chlorophyll formation.
J. Amer. chem. Soc., 1947, **69**: 1492-6, bibl. 11.

k STEWARD, F. C., AND STREET, H. E. 581.192
The nitrogenous constituents of plants.
Ann. Rev. Biochem., 1947, **16**: 471-502, bibl. 194.

l UPPAL, B. N., DAJI, J. A., AND PATEL, M. K. 631.461.2
Influence of root excretions and germinating seeds on nitrogen-fixation by *Azotobacter*.
From reprint *Proc. Indian Acad. Sci.*, 1947, **25**: 173-7, bibl. 12.

TREE FRUITS, DECIDUOUS.*

General.

39. KESSLER, H. 634.1/7(42)
Englands Obstbau. **(Fruit growing in England.)**
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 251-6, 271-9.

A description of, and incidentally a tribute to, top fruit growing in England. Although apple and pear production in this country does not amount to much more than about half the Swiss crop, English methods of intensive culture appear to yield a higher percentage of quality fruit. The author is particularly struck by the close collaboration between research stations and growers and the rapidity with which new developments are introduced into practice.

40. HATTON, R. G., AND MONTGOMERY, H. B. S. 634.1/7(42)
East Malling Research Station.
Research, 1948, **1**: 177-80.

This article gives a brief account of the main lines of activity and outlines the results achieved at East Malling.

41. CUNY, L. 634.1/7(44)
Orientation à donner aux plantations fruitières nouvelles. **(Future fruit planting in France.)**
Jardins de France,† 1947, **1**: 5-12, 45-50, 80-4.

Fruit growing in France has been carried on under difficulties. Orchards are scattered, and the varietal population is excessive and unbalanced; this is partly due to lack of official guidance. Irregular bearing is frequent, particularly inland where frost damage is more frequent; thinning is not generally practised. In some districts farmers grow fruit as a subsidiary crop, and it may be neglected in consequence. With the help of her territories overseas, France can and should become self-sufficient at a higher level of consumption. Producers must be able to compete with imports, and they should pay attention to quality and grading; the needs of processors must be remembered. The author discusses ways and means of increasing production to ensure adequate supplies throughout the year.

42. CHOUARD, P. 634.1/8(44)
Le 78e. Congrés National de la Société Pomologique de France. **(The 78th National Congress of the Pomological Society of France.)**
Rev. hort. Paris, 1947, **119**: 400-8.

Abstracts are given in the *Revue* of fourteen papers on fruit-growing, the control of diseases and pests, and the storage of fruit.

43. SPRENG, H. 634.1/7(494)
Von der blüte zur frucht: de la fleur au fruit. **(From flower to fruit.)**
Verbandsdruckerei A. G. Bern, 1947, pp. 49, Fr. 3.

An illustrated account, with a commentary in German and French, of the development of fruit cultivation in Switzerland over the last 25 years.—Oeschberg.

44. CUNY, L. 634.1/7-1.16
Les expertises fruitières. **(Valuation of fruit crops.)**
Rev. hort. Paris, 1945, **117**: 181-7 [received 1947].

An ingenious graphical method is developed. In addition to pome and stone fruits the following are considered—strawberry, raspberry, gooseberry, olive, fig and various nuts.

45. ROUSSEAU, P. M. 634.63
Le rendement industriel des olives en huile de l'utilité de sa détermination. **(The industrial yield of olive oil: the value of its determination.)**
Fruits et Prim., 1947, **17**: 394-5.

It is urged that the olive crop should be valued on the basis of the amount of oil present in the fruit. Brief reference is made to a recently developed method in which the oil present in a sample of fruit can be determined in an hour or less.

46. DONNO, G. 634.63(457)
L'olivicoltura in provincia di Benevento con particolare riguardo alle principali razze di olivo coltivate. **(Olive growing in the Province of Benevento, S. Italy.)**
Ann. Fac. Agrar. Portici, 1942/43, Ser. 3, **14**: 308-56, bibl. 3 [received 1947].

A full account of olive growing in the province of Benevento, the problems presented by climate, and the characteristics of 8 leading varieties.

47. THOMAS, P. H. 634.14
Quince culture. Training and treatment.
Tasm. J. Agric., 1947, **18**: 18-19.

Quinces grown in Tasmania are varieties of *Cydonia vulgaris*, with elongated elliptical fruits and stiff, dark foliage, and *C. sinensis* with pear-shaped fruits, often with a distinct shoulder, and larger, pendulous soft leaves. Whilst other fruits are carefully cultivated, there is a general tendency to leave the quince to its own devices; pruning is often neglected, manuring seldom practised and pests are allowed to breed almost unchecked. The fruit is processed in a number of different ways, and more care in its production is advocated. The quince thrives best on rich sandy alluvial loams. It is propagated chiefly by rooting cuttings of Angers quince and budding these with the desired varieties. Quince seedlings can also be raised and budded or grafted. Trees on seedling stocks are the most vigorous and less prone to develop suckers than those on layers or cuttings. The quince may be trained so that it is symmetrical and evenly balanced. Of the newer varieties those tested in Australia, which have produced good crops of high quality, are Missouri, Mammoth, Champion, Smyrna, and Portugal. These are generally suitable for processing, being smooth skinned, easily peeled, and possessing a fine flesh texture.

48. ASTREGO, J. J. 634.25
Perzik en perzikcultuur. **(Peaches and peach cultivation.)**
(*Publ.*) *Minist. Landb. Vissch. en Voedselvoorz.*, 1946, pp. 174, 97 text figs., 3 coloured plates, State Publishers, The Hague, Holland.

This bulletin describes the peach and its culture with particular reference to cultivation on a commercial scale under glass in Holland. Very few peach trees are grown in the open in Holland and the fruit of those is nearly all reserved for home consumption. Peach culture in the open is thus dismissed in two pages, though an orchard of standard peaches in south Holland is illustrated. Chapter XI (pp. 82-96) describes in detail planting systems under glass and is well illustrated to show houses of different types, and the arrangement of trees trained just below the glass with temporary trees under them. Other chapters deal with the characters of the vegetative and floral organs of the peach and their value for the determination or recognition of varieties, its origin and geographical distribution (with maps), pollination and pollinator varieties, propagation and the rootstock question, pruning, thinning, diseases and pests, cultural operations, harvesting, packing and transporting the crop, production and production costs, choice of varieties, and processing. Thirty-three varieties are described in detail, some of them illustrated, and mention is made of other less well known varieties. Chapter XII, on pruning and pruning methods, has special reference to training the branches for shaping the trees and for avoiding long lengths of bare wood. The question of having beehives in the houses during the blossoming period is discussed (p. 48). Table 2 (pp. 75-6), a list of rootstock varieties and

* See also 590.
† Replaces *Bull. Soc. nat. Hort. Fr.*

their potentialities, is abridged and adapted from the Technical Communication 9 of this Bureau. On page 130 is a spray calendar for the control of the pests and diseases described in chapter XIV. Fruit growers who contemplate the cultivation of peaches under glass will find the information in this bulletin both interesting and profitable, and the amateur who grows peaches for domestic use will get useful hints for carrying out the necessary operations, particularly as much of the advice is applicable to peaches grown under glass or in the open.

49. BROOKE, J. 634.25
Bush peaches in the garden [in England].
The fruit year book 1947, R.H.S., Lond., No. **1**, pp. 53-62.
The writer, a successful grower of peaches in the open, recommends the variety Peregrine for the garden. He outlines cultural methods and the control of diseases.

50. EVREINOFF, V. A. 634.16
Le bibacier ou nèflier du Japon. **(The loquat.)**
Rev. hort. Paris, 1944, **116**: 133-7 [received 1947].
Although the loquat flowers in autumn and rarely fruits where severe frosts occur, if grafted on quince or, better, hawthorn it can be grown where vine growing is possible in France. Japanese, Californian, Italian and Algerian varieties are described. Instructions are given for cultivation, harvesting and the control of pests and diseases.

51. EVREINOFF, V. A. 634.13-1.541.11
Note sur *Amelanchier canadensis*. **(Note on *A. canadensis*.)**
Rev. hort. Paris, 1947, **119**: 425-6.
The June-berry, *Amelanchier canadensis*, is sufficiently hardy to be grown in the north of France, and its fruit is more desirable for eating or wine making than that of *A. vulgaris*. It also serves as a rootstock for pear.

52. TUKEY, H. B. 634.1/7(74/75)
The backyard fruit garden in eastern United States.
The fruit year book 1947, R.H.S. Lond., No. **1**, pp. 50-4.
Although the amateur was responsible for most of the fruit grown in the United States in the last century, he was soon eclipsed by the commercial grower. For a time legislation was directed against the private grower, but recently interest in home fruit growing has increased greatly. Strawberries and other soft fruits are widely planted and the peach is generally grown. The introduction of the Malling rootstocks and the appreciation of their value in the garden have led to a demand that far exceeds the supply; a further stimulus to apple growing is the comparative ease with which pests and diseases can now be controlled.

Varieties and breeding.

53. ANON. 634.1/8(773)
List of fruits recommended [for Illinois] by district horticultural societies in cooperation with the Department of Horticulture, University of Illinois.
Trans. Ill. St. hort. Soc. for 1946, 1947, pp. 34-40.
Lists of apples, pears, peaches, plums, cherries, apricots, quinces, grapes, blackberries, raspberries, gooseberries, currants, strawberries and nuts.

54. MCMUNN, R. L. 634.11+634.25+634.75(773)
Apple, peach and strawberry variety survey, Illinois, 1946.
Trans. Ill. St. hort. Soc. for 1946, 1947, p.p. 210-35.
Similar surveys were made in 47 other states of the U.S.A. and in Canada. The results of the national survey will be published in the proceedings of the American Pomological Society. Similar surveys of grape, plum and cherry varieties were planned for 1947.

55. BOWMAN, F. T. 634.1/8(944)-1.521
Fruit breeding in N.S.W.
Fruit World Aust., 1947, **48**: 9: 10.
Pollinations showed that Granny Smith, Delicious and Jonathan apples are self-sterile and that Rome Beauty is partially self-fertile. Of pears, Williams and Beurré Bosc set fruit freely without pollination in New South Wales, and this fruit can be carried to maturity with the help of pre-harvest hormone sprays. Most plums, peaches and apricots are self-fertile. Early Lyons, Mezel, and Twyford form an important self-sterile group of cherries. Cross-pollinating groups have been worked out for almonds. New aphis-resistant apple clones have been evolved for trial as rootstocks. The breeding of new varieties aims at securing resistance to disease.

56. TYDEMAN, H. M. 634.11-1.523
Some new dessert apples bred at East Malling.
The fruit year book 1947, R.H.S., Lond, No. **1**, pp. 27-30.
The paper gives an account of apple-breeding work in progress at the East Malling Research Station with the object of providing apples as similar as possible in appearance and flavour to Worcester Pearmain and Cox's Orange Pippin, but ripening in succession. Brief descriptions of six promising new varieties, bred for this purpose and now undergoing trial, are given. [Author's summary.]

57. POTTER, J. M. S. 634.11-1.523
Dessert apples for the amateur.
The fruit year book 1947, R.H.S. Lond., No. **1**, pp. 31-5.
In suggesting apples suitable for the garden, it is emphasized that varieties are influenced by locality so much that local opinion should be consulted. The question of compatibility is also discussed.

58. WRIGHT, P. H. 634.11-2.111-1.523
A source of hardiness in apples.
Canad. Gr, 1947, **70**: 9: 9.
Heyer 12, a seedling crab, withstands temperatures of —53° F. Its fruit is of poor quality, but it may be a good source of hardiness for the breeder.—Saskatchewan.

59. BLAKE, M. A. 634.11-1.523
Some problems involved in securing the prompt evaluation of the progeny of apple crosses.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 170-4.
Hints to apple breeders in New Jersey. Briefly and roughly the advice is:—give seedlings plenty of room, give ideal culture, don't prune; when bearing age is reached, classify under 2 heads, (*a*) individual characters and (*b*) tree as an entity. Note seasonal variations, flower characters and fruit characters.

60. BREGGER, J. T. 634.11-1.521
Who is planting what varieties of apples and where ?
Fruit Prod. J., 1947, **27**: 50-1.
This analysis of apple varieties grown in the United States is based on three questions—(1) what varieties are now grown, (2) what would you plant in a new orchard, and (3) what would you omit in future. Delicious and its red strains are the most frequent at present, but for future plantings New England States prefer McIntosh, North Atlantic States Rome, and North Central States Jonathan. In general fewer varieties are being grown now, and, except in the north, there is a tendency to prefer the red strains. Growers are conservative and slow to plant new varieties, whose distribution is also delayed by the quarantine regulations of the western states.

61. EVREINOFF, V. A. (THIEM, H.) 634.11
Variétés de pommiers à floraison tardive pour haute altitude. **(Late flowering apple varieties for high elevations.)**
Rev. hort. Paris, 1945, **117**: 311 [received 1947].
An abstract of an account by Thiem of Karlsruhe in *Deutscher Obstbau*, March 1942. Of about a hundred apple varieties studied, the latest was Spätblühender Taffetapfel, which generally flowers in June. Some 12 others, including Cox's Orange Pippin, are designated as late or very late flowering. Six others are noted as being particularly resistant to unfavourable conditions in spring. All varieties were grown in the open as standards on seedling rootstocks.

62. ANON. 634.13
A bright red pear.
Better Fruit, 1947, **42**: 5.
The Max-red Bartlett has been patented by A. MacKelvie, East Zillah, Washington. This pear is a sport of Bartlett; its fruit is cranberry red in colour, has 10% more sugar and a thicker neck.

63. TETEREV, F. K. 634.23
***Cerasus fruticosa* (Pall.) Borkh.—its breeding and cultivation in the central and northern parts of the U.S.S.R.** [Russian.]
Vernalization and plant breeding, pp. 94-124—being a collection of dissertations published by Lenin Acad. agric. Sci. Moscow, 1937, pp. 184 [received 1947].
The so-called steppe cherry was found to be a compound species consisting of *C. fruticosa* (Pall.) Borkh. Sens. Str. and *C. arborescens* n. sp. It exhibits great variability, and among the forms of it found are characters of much practical value: early fruit bearing, early ripening, dwarf growth, hardiness, adaptability to poor soil, and need for little attention. There is no evidence of evolutionary relationship between the sour and sweet cherries; but the species here considered have exerted their influence on closely, and more distantly, related species. Mičurin, for example, is believed to have bred most of his best cherries from the two conspecies mentioned above.

64. GENEVOIS, L., AND PEYNAUD, E. 634.22: 581.192
Composition de neuf variétés de prunes. **(Composition of nine plum varieties.)**
Rev. hort. Paris, 1947, **119**: 317-8.
The juice of plums grown at Pont-de-la-Maye, Bordeaux, was analysed and the following data are recorded:—pH, sugars, organic acids, minerals, nitrogenous substances, tannins, pectins.

65. CRANE, M. B. 634.23-1.523
An extended trial of seedling cherries.
J. Pomol., 1947, **23**: 109-11.
Cherry breeding, begun at the John Innes Institution in 1921, has had as one of its results the introduction of the following new seedling varieties of sweet, black cherries in 1945-6: Merton Bigarreau, Merton Favourite, Merton Heart, Merton Premier and Merton Bounty. The parentage of these seedlings, now undergoing extended trial, is shown. Merton Bigarreau belongs to Pollination Group II and Merton Heart to Group IV (see next abstract).—John Innes Hort. Res. Inst.

66. HART, R. 634.23-1.523
The new Merton cherries.
J. Pomol., 1947, **23**: 112-16, illus.
A full description is given of each of the five new Merton cherry varieties referred to in abstract 65 above. Photographs illustrate fruits and stones.—Kent Farm Inst.

67. GENEVOIS, L., AND PEYNAUD, E. 634.25: 581.192
Composition de 16 variétés de pêches. **(Composition of sixteen peach varieties.)**
Rev. hort. Paris, 1947, **119**: 295-8.
From the analysis of the juice of peaches grown at Pont-de-la-Maye, Bordeaux, the following data are recorded: pH values, sugars, bases, acids, pectins, nitrogen (as NH_4 and NH_2), tannins.

Propagation and rootstocks.*

68. CONNOR, E. C. 634.11-1.531
The storage and germination of apple seed.
Agric. Gaz. N.S.W., 1947, **58**: 414-6.
Advice is given on the extraction, storage, and planting of apple seed and on the treatment of the seedbeds, with brief notes on the diseases and pests of the seedlings.

69. THOMAS, P. H. 634.1/2-1.531
Propagating seedling stocks from pome and drupe fruits.
Tasm. J. Agric., 1947, **18**: 149.
A short article on seed extraction and stratification.

70. TARASENKO, M. T. 634.23-1.535: 577.17
An account of work in 1944 on rooting cuttings of fruit plants with synthetic growth substances. [Russian.]
Proc. sci. Conf. Timirjazev agric. Acad. 1944, 1945, **2**: 89-90 [received 1947].
Treating acid cherry cuttings for 12 hours with 0·0025% indolebutyric acid had a marked effect on (*a*) the number of roots developed, (*b*) the rapidity of root development, (*c*) the rate of development of the roots and shoots of the rooted cuttings. The best results were given by cuttings taken from shoots at their period of most intensive growth in length. The same treatment of plum cuttings also gave good rooting, particularly in certain varieties. Some varieties of gooseberry gave a more marked response than others to the treatment, in every case the best results being obtained with the terminal cuttings of shoots.

71. GAYFORD, G. W. 634.1/2-1.541
Selection and storage of scions for grafting.
J. Dep. Agric. Vict., 1947, **45**: 309.
Scions for grafting deciduous trees can be collected at any time during the pruning season from June to August (in Victoria), the later the better, provided that buds have not burst. If citrus or stone fruits are to be reworked by budding they should be cut back hard, just before the new growth starts in spring, the budwood being selected in the spring or late summer for citrus and late summer for stone fruits. For pole-grafting, scions should be well-matured annual shoots about $\frac{3}{8}$ in. thick; for top-working they may be slightly thicker. They should be heeled-in in a cool, moist situation with good drainage, or they may be kept in a cool store, but then they should be frequently inspected, and if they show signs of drying out before they are required in October they may be stood upright in a few inches of water until they revive. If heeled-in scions start to grow they should be pulled up and left out of the ground (in shade) for a few days, to retard growth, and then replaced in the soil.

72. LAPÉDAGNE, H. 631.541.5: 634.1/2
Plantation précoce des égrains. **(Early planting of budded plants.)**
Rev. hort. Paris, 1946, **118**: 53-4 [received 1947].
Fruit stocks budded in summer should be planted out in the following March or April, and the stock cut back in May.

73. GAGNARD, J. 634.1/3-1.541
A.B.C. du greffeur. **(The grafter's A.B.C.)**
Doc. Rens. agric. Alger. Bull. **134**, 1947, pp. 19.
An illustrated account of grafting deciduous fruits and citrus. When top-working a tree whose shade usually keeps sunlight off its trunk, the trunk is whitewashed to

* See also 14-22.

avoid damage to the bark by excessive heat. A list of rootstocks indicates their suitability for different soils and for irrigation.

74. AUBERT, P. 634.23-1.541
Essais de greffage de cerisiers. **(Cherry grafting trials.)**
Rev. romande Agric. Vitic., 1946, **2**: 53-5.
A review of certain experiments described in previous articles (*H.A.*, 17: 1954), the main point being that the best results were obtained from grafting in autumn.

75. BLAKE, M. A., EDGERTON, L. J., AND SCHNEIDER, G. W. 634.1/2-1.541
The stub graft.
Circ. N. Jer. agric. Exp. Stat. **507,** 1947, pp. 8, bibl. 1.
The stub graft is particularly useful for grafting branches from ⅜ to ¾ in. in diameter, too large for whip grafting and too small for cleft grafting. It has been used by the authors for apples, chestnuts, and peaches.

76. M[EUNISSIER], A. 631.541.11: 634.1/2
Arbres fruitiers à plusieurs souches pour une seule cime. **(Fruit trees with multiple rootstocks.)**
Rev. hort. Paris, 1946, **118**: 15 [received 1947].
A few seeds are planted close together, and three of the seedlings are tied together at about 1 ft. to induce a natural approach graft. In the Hautes-Alpes Department of France such multiple peach trees resist winds. In Algeria after three seedling carobs have thus joined, the most vigorous shoot is grafted, the others being cut off. The fig may be treated in a similar way.

77. IVANČENKO, P. L. 634.1/8-1.541: 581.14
Economic modifications of valuable characters in fruit plants by grafting. [Russian.]
Agrobiologija, 1946, No. 3, pp. 143-5.
The data recorded confirm the work of previous workers showing that the mutual influence of the rootstock and scion affects not only the shape of fruit and leaves of the resulting vegetative hybrids, but also the colour, quality and chemical composition of the fruit.

78. KEMMER, E. 634.1/2-1.541.11
Zur Frage der Grundlagenforschung im Obstbau. **(Fundamental research in fruit growing.)**
Züchter, 1947, **17/18**: 155-8, bibl. 2.
In the author's opinion pomology suffers from the lack of fundamental research. In rootstock research, for instance, the workers confine themselves to the observation of certain rootstocks in combination with the more important commercial varieties. What knowledge is gained on the *nature* of the rootstock-scion relationship is therefore only incidental. The author is chiefly concerned with seedling rootstocks and he considers a group of 10 subjects, the study of which is necessary in each case to elucidate the rootstock effect: (1) The rootstock unworked; (2) the rootstock worked on itself; (3) the variety on its own roots; (4) the variety worked on itself; (5) the variety worked on the rootstock; (6) the rootstock worked on the variety; (7) the rootstock double-worked on itself with variety as intermediate; (8) the variety double-worked on itself with rootstock as intermediate; (9) rootstock worked on M. IX and (10) variety worked on M. IX as controls. A list of varieties is given which can easily be grown on their own roots by the nurse root grafting method. A further suggestion is that it is necessary for the study of a seedling to work it on clonal rootstocks, especially M. IX, in its first or second year. Whereas triploid seedlings often show poor growth on their own roots, they were found to do well on paradise rootstocks. This observation may be of significance for the breeding of triploid seedling rootstocks.—Inst. Obstbau, Berlin Univ.

79. KEMMER, E. 634.1/2-1.541.11
Die Unterlage als Standortfaktor. **(The rootstock as a locality factor.)**
From reprint *Land. Wald. u. Garten*, 1947, H.11, pp. 4, bibl. 5.
The article adds further material to the author's thesis that the rootstock must be regarded as a locality factor; see also *Dtsch. Obstbau*, 1943, 58: 97-8; *H.A.*, 14: 1056. Of the examples discussed and illustrated the following may be quoted: After bridge-grafting a branch of Goldpearmain with quince the varietal character of the treated branch changed. Instead of the usual dense leaf clusters leaf formation became sparse, but individual leaves were abnormally thick. Very small and very sweet fruits with a hard skin were produced instead of the normal fruits. However, these notable deviations from the varietal character and from the leaves and fruits appearing on the rest of the tree need not necessarily be due to the inserted quince. They might be considered as symptoms of senile degeneration. From other observations recorded the author concludes that, where more than one rootstock is used for a fruit tree, the vigour of the tree is determined by the arrangement of the rootstocks. In a vertical arrangement the rootstock that is most dwarfing and in a horizontal arrangement the rootstock that is most vigorous exerts the determining influence on tree growth.

80. DAY, L. H. 631.541.11: 634.11 +634.14 +634.13
Apple, quince, and pear rootstocks in California.
Bull. Calif. agric. Exp. Stat. **700,** 1947, pp. 44, bibl. 37.
Apple rootstocks for commercial planting in California are grown from so-called French seed from fruit of standard varieties grown in Oregon and Washington. No rootstock resistant to woolly aphis has yet proved satisfactory. Quince varieties are budded on rooted stem cuttings of quince. Pears are now grown either on so-called French seedlings, from Bartlett or Winter Nelis fruit grown in Oregon and Washington, or on quince roots with Hardy as intermediate. The blight-resistant Old Home is often used as an intermediate stock on French seedlings, and it may be used instead of Hardy on quince. Several of the Oriental species have been used in the past, but some have produced black-end fruits. The relation between rootstock and soil, climate, pests and diseases is discussed.

81. WOODHEAD, C. E. 634.11-1.541.11
Rootstocks for New Zealand apple orchards.
Orchard N.Z., 1946, **19**: 6: 8-10.
Trials with rootstocks, including a number of the East Malling series, are described. Sturmer and Delicious on their own roots have been under observation for several years and the former is giving much heavier crops than trees on Spy stock. New apple rootstocks are also being tested and, if they prove superior to those at present recommended, will be made available to the industry through the nursery of the N.Z. Fruitgrowers' Federation.

82. SMITH, W. W. 634.11-1.541.11
The low-down on dwarf apple trees.
Amer. Fr. Gr., 1947, **67**: 10: 10-11, 26-7, 33, 35.
In a popular article the author analyses various observations of the growth of apples on Malling rootstocks in North America. He concludes that, while M. IX is of value only in the garden, M. VII with a Virginia Crab intermediate may be of value for the intensive orchard in the northern states.—University of New Hampshire.

83. AUBERT, P. 634.13-1.541.44
Essais de double greffage sur poiriers. **(Experiments on double-worked pears.)**
Publ. Stat. féd. Ess. vitic. arboric., Lausanne, **357,** 1947, pp. 11.
The following composite pears, all on quince rootstocks, were produced by making the second graft at 1·5 m.: Passe

Crassane/Williams Bon Chrétien, Passe Crassane/Louise Bonne d'Avranches, Louise Bonne/Passe Crassane. Each variety was also planted as a simple scion on quince. The mean weight of a single fruit of Passe Crassane was increased considerably by association with Dr. Jules Guyot, which, however, produced very little fruit. The relative position of the two fruiting parts did not appear to affect their interaction. The quality of the fruit was not affected under the conditions of this trial.

84. Hill, R., and Beakbane, A. B. 634.2-1.541.11
The application of biological observations on wild and naturalized species and varieties of fruit trees to the study of fruit tree rootstocks. A preliminary study of some *Prunus* species.
J. Pomol., 1947, **23**: 117-33, bibl. 12, illus.

Some of the main desirable properties of fruit tree rootstocks are described. The properties chosen for consideration are grouped as follows:—(1) indication by direct observations in the field on (i) ease of vegetative propagation, (ii) working, (iii) vigour; and (2) indication by experimental trials of compatibility of rootstock and scion. A description of apple rootstocks is given showing how the effect of the unworked rootstocks of extreme types on their own stems agrees in general with their effect on scions worked on them. Observations have been made on wild and naturalized fruit trees which show the existence of a greater range of useful material than is usually available in ordinary horticultural practice. Possible methods of recognition of properties in the field are discussed. Ease of vegetative propagation with field material was tested by growing cuttings. The data on habit of growth in relation to amount of living tissue in roots obtained from the unworked extreme dwarfing types of apple rootstocks have been found to apply to certain species of *Prunus*. When making use of the present hypothesis in estimating vigour it was found necessary to measure the variation of per cent. bark in relation to thickness of root. [From authors' summary.] Notes on the graphical representation of variation of measurements on individuals and the variation of per cent. bark with thickness of root in the same individual are given in an appendix.

85. Cuenot, [G.], Ballot, —., and Praloran, —. 634.22: 631.541.11
Observations sur le comportement de différents porte-greffes de pruniers. **(Observations on the behaviour of various plum rootstocks [in Morocco].** (*Mim. Publ.*) *Serv. Hort., Rabat*, 1947, pp. 10, bibl. 3.

A study of six rootstocks, some grafted and some not worked, planted in 1938. Neglected as a result of the war, these trees suffered from an attack by *Capnodis tenebrionis*. A local myrobalan, E.F. 74, and Brompton plum showed a survival rate much higher than other myrobalans, *Prunus mariana*, and *P. insititia*. Scions.—Giant and Golden Japan grew most vigorously on E.F. 74 and were compatible with Brompton plum. Agen prune failed to survive.

86. Evreinoff, V. A. (Plock, H.). 634.22-1.541.11
Prunus pissardii comme porte-greffe. **(*Prunus pissardii* as a rootstock.)**
Rev. hort. Paris, 1946, **118**: 15 [received 1947].

Prunus pissardii has been used as a rootstock for plums and peaches. It is particularly suitable for the mirabelles, and does well on dry and sandy soils. Trials at the fruit research station at Marburg, Styria, were reported in *Deutsches Obstbau*, 1942, No. 8.

87. Evreinoff, V. A. 634.23-1.541.11
Cerisier nain des sables. **(The dwarf sand cherry [*Prunus besseyi*.)**
Rev. hort. Paris, 1946, **118**: 116-7 [received 1947].

The sand cherry can be used as a dwarfing rootstock for plums and cherries.

88. McHatton, T. H. 634.25-1.541.11
Variations in peach tree yields.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 121-4.

Tests in Georgia on Elberta peach trees under the same conditions of soil, climate and culture indicate that the great variable in all the trees concerned is the rootstock and that attention should be devoted to the asexual propagation of stocks adapted to particular peach varieties and soils.

*Pollination.**

89. Osterwalder, A. 634.11: 581.162.3
Apfel-Xenien ? **(Xenia in apple ?)**
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 397-402.

There is no evidence for the influence of the pollen on the development of the fruit in apple and pear, although many assertions to that effect have been made.

90. Overley, F. L., and Bullock, R. M. 581.162.3
Pollen dilutents and application of pollen to tree fruits.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 163-9, bibl. 1.

The following methods of pollinating apple trees were tested in Washington State:—hand method, bellows type small hand duster, water sprays containing pollen, aeroplane dusting, application by bomb, application with growth substances, application with various dilutents. Much the best results came from hand pollination. Nearly all the other methods were very disappointing.

91. Golubinskii, I. N. 581.162.3
The influence of pollen grain mixtures and density on their germination. [Russian.]
Agrobiologija, 1946, No. 3, pp. 59-70, bibl. 28.

From the data tabulated the author concludes that the germination of pollen grains of flowering plants is affected by environmental conditions, e.g. food supply, the influence of the rootstock (data tabulated for pear), the age of the plant, etc. The percentage germination of the pollen grains and the length of the pollen tube increase as the density of sowing the grains increases. When the pollen of two or more species are germinated together they exert a mutual stimulating or inhibiting effect.

92. Lu, K. M. 634.25: 581.162.3
Pollination experiments on peach. [Chinese.]
Northwestern Agriculture, 1946, **1**: 14-17.

Experiments on self- and cross-pollination were made on six varieties of peach. All varieties showed more than 44% fertility under conditions of natural cross-pollination. Two varieties were found to be self-incompatible and one of them gave very low fertility when used as pollen plants in artificial cross-pollination.

93. Katrandžiev, G. 634.1/7: 631.522
Sterility and flowering in certain species and varieties of fruit in the Drenovo fruitgrowing area. [Bulgarian, with German summary 1 p.]
Bull. Minist. Agric. State Fruit Res. Stat. Drenovo **2**, 1941, 61 pp., bibl. 9 [received 1947].

Observations on fruit trees in the Drenovo area have led to the following conclusions. All apple and pear varieties on the research station at Drenovo are self-sterile or practically self-infertile. The varieties Boiken and Holland Rennet are significantly (12-40%) self-fertile, but this is not constant and depends on nutrition and weather conditions. The cherry varieties are completely self-sterile; in no case was intersterility found. The germination capacity of the pollen bears no relation to yield. In apples the good pollinating varieties show a high germination capacity on artificial media. The Kistendil Blue plum is self-fertile and fruits freely in pure plantings. All the peach varieties

* See also 498, 638.

examined, and the Hungarian apricot are self-fertile and also bear crops in pure plantings, the American variety J. H. Hale being the only exception.

94. Iliev, I. 634.23 +63(497.2)
Cherry investigations at Drenovo and Leskovetz. [Bulgarian, with German summary 2 pp.]
Bull. Minist. Agric. State Fruit Res. Stat. Drenovo **4**, 84 pp., bibl. 40 [received 1947].
A pomological investigation was carried out in 1937-9 on 23 sweet and 2 acid cherry varieties grown in the Drenovo fruit research station (16 varieties including the acid kinds) and in orchards at Leskovetz (9 varieties), to ascertain their periods of flowering in relation to cross-pollination. Tables are given showing the range in time of blossoming, the germinating capacity of pollens of 20 varieties in 15% sugar solution, and the productivity arising from 141 crosses. A pomological classification is suggested, the characters of the stone being considered important in this connexion. The 25 varieties are fully described and most of them, with their stones, are illustrated.

95. Gagnieu, A. 634.11: 581.162.3
Comportement caryologique et caractères du pollen de diverses variétés de pommiers du centre de la France. **(Cytological behaviour and characteristics of the pollen of different varieties grown in central France.)**
Ann. agron. Paris, 1947, **17**: 365-92, bibl. 40.
An account of cytological studies is followed by results of the examination of apple pollen grains and of their germination on agar with sugar added.

Growth and nutrition.

96. Lessler, M. A. 634.11: 581.192: 543.812
Effect of a temperature gradient on distribution of water in apples.
Bot. Gaz., 1947, **109**: 90-4, bibl. 6.
Water moved from the warmer to the cooler side of mature apples subjected to a temperature gradient, whether the temperature difference was maintained or interrupted every 12 hours. The movement is not reversible. On a sunny day a difference of 9·7° C. was recorded between the sunny and the shaded sides of Wealthy apples on the tree.—Cornell.

97. Oppenheimer, H. R. 581.19: 543.812: 634.1/2
Studies on the water balance of unirrigated woody plants.
Palestine J. Bot. (R), 1947, **6**: 63-77, bibl. 19.
The first part of the paper deals with cases of extreme restriction of plant transpiration after prolonged summer drought. The second part reports a preliminary study of water expense and water balance in unirrigated plum and apple trees, carried out in September, about five months after the last effective rains.

98. Dobronov, L. G., and Gladysheva, O. M. 634.11: 581.192
Qualitative differences between fruits from different parts of the crown of an apple tree.
C. R. Acad. Sci. U.R.S.S., 1947, **55**: 651-4, bibl. 8.
The different vertical zones of a mature apple tree produce fruits different in size and chemical composition. The rate of formation and maturation of the fruits increases (within certain limits) with the order of ramification.

99. Lobanov, N. V. 581.144.2
A method for investigating the growth of roots in woody plants under various conditions of soil moisture.
C.R. Acad. Sci. U.R.S.S., 1947, **55**: 547-50, bibl. 9.
Roots of 3- to 4-year-old nursery trees were introduced into lamp glasses with soil of different moisture content, sunk in the soil and examined about two months later. The method described makes possible the study of growth in isolated roots of woody plants, and could be applied to fruit trees.

100. Krupenikov, I. A. 581.144.2: 631.415.3
Halotropism of roots of plants.
C.R. Acad. Sci. U.R.S.S., 1947, **55**: 767-8, bibl. 2.
A clear-cut negative halotropism of the roots is shown in a number of fruit trees. Upon certain salinized soils of the Hungry Steppe (Uzbekistan) the apple, peach and pear are grown in many orchards. In these soils at a depth of about 70 cm. there is a highly salinized and gypsified layer. On reaching this layer the apple and peach roots in most cases spread horizontally or even grow upwards, while the pear roots freely pass the salt-bearing horizon and penetrate far beyond it. All three varieties grow on the Hungry Steppe more or less satisfactorily, but the pear nearly always grows better than apple or peach.

101. Cocchia, G. 634.1: 581.47
Contributo allo studio della morfologia del frutto delle *Pomoideae*. **(Fruit morphology in the *Pomoideae*.)**
Ann. Fac. Agrar. Portici, 1943/46, Ser. 3, **15**: 161-74, bibl. 8.
After an introductory discussion on the morphology of the fruit of the *Pomoideae*, in which he reviews the ideas of various workers as to its structure, the author describes, and illustrates with drawings, sections of apple fruits to show particularly the distribution of the vascular strands.

102. Partridge, N. L. 634.1/7: 581.14
A method for the estimation of the advancement of vegetation by the use of daily maximum temperatures.*
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 7-14, bibl. 3.
An account of a method whereby temperature data can be used as a basis for a fairly accurate estimate of the advancement of orchard vegetation. Such an estimate may be of considerable use to climatologists and agricultural statisticians in comparing the stage of growth reached in different seasons and at different places characterized by similar climatic features.—East Lansing, Mich.

103. Mani, V. K. S. 634.11: 581.14
Vivipary in *Pyrus malus*.
Curr. Sci., 1947, **16**: 321.
A case is recorded of an apple containing 8 healthy seedlings and 2 seeds.—Agric. Met. Section, Poona, India.

104. Saburov, N. V. 634.2
The influence of the region of raising on the modification of the composition and characters of stone fruits. [Russian.]
Proc. sci. Conf. Timirjazev agric. Acad. 1945, 1946, 3: 76-8.
The chemical composition of stone fruits grown in the Crimea, North Caucasus, Georgia, Armenia, Daghestan, Moldavia, and Central Asia, was investigated. In cherries there was no marked difference. In plums and apricots, however, there were differences in the sugar content and in acidity. The data for plums, shown diagrammatically, indicate that the maximum sugar content was in fruits from Central Asia and the Crimea. and the minimum from Georgia, Daghestan and North Caucasus. The best peaches came from the Crimea and Armenia; the same varieties from Central Asia contained less sugar and had a poorer flavour.

* See also 37.

Manuring and cultural practice.

105. Proebsting, E. L. 634.25-1.84
Distribution of nitrogen in peach trees.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 15-17.
The amounts of nitrogen in roots, stumps, branches and twigs of mature peach trees were determined and are here tabulated. Further details were also taken from peach trees to which 20 lb. ammonium sulphate was applied yearly for 4 years. A very high nitrogen content was built up in the top 8 feet of soil, which is the major root zone, without excessive absorption or adverse tree response occurring. It is possible that a slight boron excess may have interfered with nitrogen absorption. It would appear from the data that even with normal rates of fertilizer the use of nitrogen by the tree is much less than the nitrogen supplied.—Davis, Calif.

106. Wittwer, S. H., and Hibbard, A. D. 634.25-1.8: 577.16
Vitamin C - nitrogen relations in peaches as influenced by fertilizer treatment.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 116-20, bibl. 9.
In south-eastern Missouri the ascorbic acid content of peaches falls as the result of heavy nitrogenous manuring especially when given in readily available form in June. Ammonium sulphate given in spray form also had a depressing effect on vitamin C. Calcium cyamide and Uramon generally gave low yields but fruit high in ascorbic acid. The data in general show, however, that the percentages of total N in the foliage or fruit of a peach at harvest are not always a reliable index of the concentration of ascorbic acid in the fruit.

107. Wander, I. W. 631.821: 634.11
Calcium and phosphorus penetration in an orchard soil.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 1-6, bibl. 2.
The calcium content of Stayman Winesap apple leaves was not increased by the use of finely ground limestone on sod or mulch for 3 years in a silt loam soil at Wooster, Ohio. The phosphorus content of the leaves was increased more by the use of superphosphate on sod than on mulch. All phosphate treatments increased leaf phosphorus. Mulch had no effect in increasing the penetration of exchangeable calcium from finely ground limestone and very little on that from superphosphate.

108. Turk, L. M., and Partridge, N. L. 634.1/7-1.87
Effect of various mulching materials on orchard soils.
Soil Sci., 1947, **64**: 111-25, bibl. 13.
A study was made of the effects on orchard soils of different kinds of mulching materials, some with additional nitrogen fertilizer, on moisture loss, on accumulation and loss of nitrates and on amount of exchangeable calcium, magnesium, and potassium in the soil. Straw and alfalfa mulches were equally effective on each of three different soils in decreasing evaporation losses. The effectiveness of the different mulching materials in decreasing moisture loss from a sandy loam were in the following descending order: straw, corn stover, alfalfa, shavings, gravel, sawdust, and peat. With the exception of peat and possibly sawdust, it is doubtful whether the differences among the other mulching materials were significant. Peat and, to a much less degree, sawdust, have such a high absorptive capacity for water that with light rains or with long intervals between rains relatively little water reached the soil. Leaching losses of nitrates were greater from unmulched than from mulched soils except where ammonium sulphate was also applied or where alfalfa mulch was used. An increase in the total quantity of exchangeable bases occurred in all soils where alfalfa mulch was used. More pronounced changes occurred in exchangeable calcium and potassium than in magnesium.

109. Gayford, G. W. 634.1/7-1.874
Green manuring.
J. Dep. Agric. Vict., 1947, **45**: 81-3.
Green manuring in Victorian orchards with notes on (1) type of plant to use (a crop of blue lupins in a peach orchard is illustrated), (2) sowing the crop, (3) fertilizers for the green crop, (4) rate of sowing seed and fertilizer, (5) ploughing the crop. The article concludes as follows. A bulky green crop when ploughed under may temporarily depress the available nitrogen supply in the soil, and although it will become available in increasing quantities as decomposition proceeds, it is desirable to have the crop down well before the blossoming period in order that the trees may not suffer from a temporary nitrogen deficiency at this stage.

110. Wilcox, J. C. 634.1/2-1.67
Sprinkler irrigation of orchards in British Columbia.
Publ. Dep. Agric. Canada **797**, 1947, pp. 53, being *Fmrs Bull.* **144**.
A fully illustrated guide to sprinkler irrigation for fruit-growers in British Columbia. The low trajectory systems are preferred, although it is not known how the wetting of leaves by overtree sprinklers affects diseases and pests. There are tables of hydraulic data. The following types of sprinkler are discussed:—Rainbird 20LA with a 7° nozzle, Browning 50, Browning 6, Buckner 7M71 and Butterfly sprinklers.

111. Wilcox, J. C., and Swailes, G. E. 634.1/2-1.67
Uniformity of water distribution by some undertree orchard sprinklers.
Sci. Agric., 1947, **27**: 565-83, bibl. 4.
Commercial undertree sprinklers were tested for uniformity of water distribution at various pressures. Certain models distributed water evenly enough to recommend their use. Tables show the appropriate pressure, nozzle size and spacing for the models recommended.—Dominion Experimental Station, Summerland, B.C.

112. Unkles, W. 631.67
Concrete-pipe making and laying for irrigation.
Fmg S. Afr., 1947, **22**: 879-88, 896.
Underground concrete pipes can be used with advantage in orchards in S. Africa. Some of the advantages are set out. Instructions are given for making and laying pipes. The subject of costs is discussed.

113. Lacombe, R., and de Chabert, F. 631.67: 634.13
Démonstation d'arrosage par pluie artificielle. **(Irrigation by artificial rain.)**
Prog. agric. vitic., 1947, **128**: 285-9.
This article, with reference to a demonstration of irrigation by sprinkling which is said to be relatively new in France but extending rapidly, describes the principles of sprinkling, the apparatus used, and the increase in yield from its application to various crops, including new potatoes and pears.

114. Katrandžiev, G. 634.1/7: 631.432.2
Soil moisture movement in cultivated and grass orchards. [Bulgarian, with German summary 2 pp.]
Bull. Minist. Agric. State Fruit Res. Stat. Drenovo **3**, 1944, 132 pp., bibl. 39 [received 1947].
The observations recorded at Drenovo lead to the following conclusions. In black fallow and in fields with beans and cereals young fruit trees developed well, and irrigation gave no noticeable improvement. One or two irrigations during the period of most vigorous growth of fruit trees in grassland did not increase the rate of development. In garden soil apples and pears made normal growth, which was better than that in grassland. Digging and loosening the soil and

the removal of weeds greatly influenced evaporation from the soil. Weeds and grasses compete seriously with fruit trees for soil moisture and nutrients. In worked ground direct evaporation during the tree growth period occurs only in the upper 25 cm.; below that capillarity moisture remains almost unchanged and a reservoir of moisture for the trees is maintained during the rainless months of August and September. In grassland, moisture during the rainless months becomes exhausted and the wilting point is reached. The rainless period in March and April has little effect in removing soil moisture in fallow and in grassland, in fact it removes only 1-5% in a surface layer 2·5 cm. deep. In a rainless summer irrigation is necessary for apples and plums in worked soil. Fruit drop often occurs from trees in grassland and in cornfields during the dry summer months, and in such cases attention must be given to improving the soil by fertilizers and irrigation.

115. ANON. 634.1/7
Orchard renovation [in Britain].
Agriculture, 1947, **54**: 426-30.
The prospects for renovation are first reviewed. The subject is then dealt with under these heads: thinning, pruning, spraying, cultivation, manuring, grass improvement, drainage and orchard gaps.

116. HAMILTON, R. G. 634.1/7
Maintenance work in the home orchard.
N.Z. J. Agric., 1947, **75**: 49-63.
Cultivation, pruning and general maintenance in the home garden are discussed. Pruning receives rather extensive treatment and is illustrated by over twenty figures.

117. SPRENG, H. 631.542: 634.1/2
Neuzeitliche Kronenpflege der Obstbäume. Oeschberg-Schnitt. **(Modern methods of building up a fruit tree. The Oeschberg method of pruning.)**
Verbandsdruckerei A. G. Berne, Switzerland, 4th edition, 1944, pp. 48, Fr. 1.60 [received 1947.]*
In this little book the author, who is pomologist of the Pomological and Horticultural College, Oeschberg, describes the method of fruit tree training developed by himself and generally known under the name of " Oeschberg Schnitt " (Oeschberg pruning method). The description relies chiefly on 50 excellent photographic illustrations, the text being more in the nature of captions. The author is concerned only with standard trees. At the first winter pruning the number of shoots is reduced to one leader and 4 limbs. The latter should be so adjusted that they are well distributed around the leader and that their angle to the perpendicular approaches 45°. At the second pruning a distinction is made between leaders and fruit branches. Fruit branches growing upright are either cut back or—if they are needed for furnishing—tied down. By removing the buds on the top side of the lateral leaders the development of perpendicular shoots is prevented and the growth is encouraged of bottom buds which will give rise to the fruiting wood. The lower part of the lateral leaders, especially, should be well furnished with fruit branches in order to stimulate their secondary growth. These principles apply to the treatment of both pome and stone fruit. In stone fruit, however, the first pruning must be carried out at planting, while pome fruit may be pruned a year later. In cherries leader pruning is discontinued after 2-3 years, unless one elongation growth has to be cut back to the length of the others. Most of this booklet is devoted to the rejuvenation of trees having a neglected or wrongly built-up top. Correction is made by cutting back very severely, viz. to one leader and 4 limbs. The further development of trees treated in this manner is illustrated.

* French and Italian editions available, the former under the title " *Principes modernes de la taille de formation des arbres fruitiers* ".

118. GAYFORD, G. W., AND GREATOREX, F. J. 631.542: 634.1/2
Pruning of young fruit trees.
J. Dep. Agric. Vict., 1947, **45**: 313-22.
A well-illustrated account of pruning fruit trees during their first, second, and third years.

119. CONNOR, E. C. 634.11-1.542
The pruning of the Gravenstein apple tree.
Agric. Gaz. N.S.W., 1947, **58**: 411-4.
The ideal Gravenstein tree should be rather widely spread and somewhat open to ensure good coloured fruits, and the young tree must be headed rather lower than usual in order to maintain good balance. During the following year all basal growths, suckers and useless lateral growth should be removed regularly in order to ensure that all growth is directed into the main shoots which are to provide the initial scaffolding. Rather heavier cutting than usual is required with this variety during the first few years of its growth. When a satisfactory scaffolding has been obtained, usually by the fifth year, pruning must be moderate to light according to the vigour of the tree.

120. AUBERT, P. 634.13-1.542
Essais de taille de poiriers nains. **(Pruning dwarf pear trees.)**
Rev. romande Agric. Vitic., 1946, **2**: 61-3, 78-9.
The author discusses the pros and cons of long (" arcure ") and the " classic " short (cutting back to three buds) pruning of small pear trees; he favours long pruning in which the branches are not cut back but are maintained horizontally, the great advantage being that such branches bear fruit all along their length. The trials described are in relation to the vigorous variety Précoce de Trevoux and the conclusions are based on tabulated yields.
In a second article he compares the yields of Beurré Superfin on quince pruned according to the " classic " short system with those reported for Précoce de Trevoux in the previous article. He concludes from his results that in certain circumstances the " classic " may give better results than the " arcure " method.

121. SILORET, G. 634.25-1.542
L'évolution de la taille du pêcher. **(The evolution of peach pruning methods.)**
Prog. agric. vitic., 1947, **128**: 244-9, 279-83.
The aim of this article is not to show how pruning should be done or to give details of a method applicable to peaches in France, but rather to indicate the methods in general use (with illustrations), how they have evolved, and how they can be improved either by perfecting classical methods or by intermediary measures with adaptations from those used in America.

122. LAPÉDAGNE, H. 634.25-1.542
Taille en cépée du pêcher, système Lapédagne. **(Renewal pruning of the peach, Lapédagne method.)**
Rev. hort. Paris, 1946, **118**: 54 [received 1947].
The author claims that anyone can prune the peach by this method. The trees are planted 2·50 m. apart, and trained to produce a short trunk with five branches. After harvest pruning of the three replacement shoots on each branch leads to the development, before leaf fall, of 15 shoots that fruit the following season.

123. NATIVIDADE, J. V. 634.1/2-1.542.12
Àcerca do equilíbrio podo-monda. **(Pruning or thinning ?)**
Bol. Junta nac. Frutas, Lisbon, 1947, **7**: 7-15.
The relation between pruning and thinning the fruit in fruit trees is discussed. Thinning is complementary to pruning, and neither is a substitute for the other. Old enfeebled trees overcharged with spurs and with little wood growth should be hard pruned, and thinning too should be practised. The fruiting of vigorous trees should be regulated mostly

by thinning with little pruning. In young trees the minimum of pruning should be done, only enough to ensure a head of good shape, and thinning should be adopted to avoid premature enfeeblement.

124. Belot, A. 631.546.1: 634.1/2 +634.8
Les arbres fruitiers en cordons horizontaux. **(Fruit trees as horizontal cordons.)**
Rev. hort. Paris, 1944, **116**: 86-90, 111-4, bibl. 3 [received 1947].
An account of the horizontal training of apple, pear, peach and vine.

125. Page, F. 631.546: 634.1/2
Le buisson dirigé. **(The controlled fruit bush.)**
Rev. hort. Paris, 1945, **117**: 297-300 [received 1947].
This method of formation produces a trunk 1·50 to 2 m. high with 6 to 8 framework branches, spaced regularly. It may be used for apple, pear, plum and apricot. Pruning after formation needs little labour.

126. Robert, E. 631.546: 634.1/2
Arboriculture fruitière moderne: haie fruitière—l'arcure et l'oblique. **(Modern training of fruit trees: the fruit hedge: arched and oblique.)**
Rev. hort. Paris, 1947, **119**: 327-8, illus.
The following forms of hedge training are described: the simple arch, the Lepage arch and the Bouché-Thomas oblique method.

127. Painter, A. C. 631.546: 634.11 +634.13
Apple and pear tree training for the garden.
The fruit year book 1947, R.H.S. Lond., No. **1**, pp. 36-42.
Diagrams illustrate this account of the formation of cordons, dwarf pyramids and the dwarf bush. Pruning.—For tip bearing varieties the modified Lorette system is described. Partial summer pruning is preferred for spur-bearers. The question of rootstocks is discussed.

128. Anon. 634.1/7(485)
Fruit in Sweden.
Abstract in *Food Manuf.*, 1947, **22**: 524.
Experiments on the prostrate training of fruit trees are being made in Jamtland and further north in Sweden, on the lines already used successfully in Siberia.* By pruning and binding the branches are made to run parallel to the ground and only a few inches above it; in winter they are covered by snow which protects them from cold. Apple trees planted at Odensala in Jamtland yielded well in the year after planting.

129. Harley, C. P., and others. 634.11: 631.55
Investigations on the cause and control of biennial bearing of apple trees.
Tech. Bull. U.S. Dep. Agric. **792**, 1942, pp. 58, bibl. 45 [received 1948].
The investigations reported include (1) a study of the changes in nutritive materials in buds associated with their differentiation into either flower or leaf buds; (2) studies through adjustment of leaf areas and ringing to modify the performance of buds; and (3) studies to determine the practicability of fruit thinning as a means of modifying the biennial-bearing habit. The more extensive investigations and biochemical analyses were conducted in irrigated orchards in the State of Washington (pp. 2-44), and fruit-thinning experiments were also made in the Potomac Valley (pp. 44-55). Analyses showed great differences within the spur; the outstanding fact is that high starch content, and not necessarily high carbohydrate : nitrogen ratio, occurs in tissues initiating blossom buds. Defoliation trials indicate that any chemical concerned in initiating blossom buds is synthesized in the leaves; and ringing experiments indicate that the chemical concerned is used by the fruits, roots, trunk and branches, in that order, before it becomes available to the buds, and suggest that the time of bud differentiation depends on the advent of apical bud formation. Fruit buds are differentiated when the leaf: fruit ratio is so adjusted early in the season as to be in excess of the needs of the developing fruit and parts of the plant other than buds. Varieties that tend to bear biennially could be influenced to differentiate blossom buds by fruit-thinning over a shorter period of time than varieties that bear regularly. In the Potomac Valley thinning within 30 days after full bloom was effective with most varieties tested; but it is of doubtful value where frost is likely to re-establish the biennial habit. Thinning might be feasible with such varieties as Yellow Transparent, which, because of their tendency to set so heavily in the on year, frequently fail to attain market size. The possibility of reducing fruit set by caustic sprays is mentioned.

* See *H.A.*, 12: 843.

130. Whitehead, S. B. 634.1/2-1.55
Breaking the biennial-bearing habit.
Gdnrs' Chron., 1947, **122**: 162.
The biennial habit of the apple is generally started by a season of heavy over-cropping, usually following a severe frost year. The most important corrective measure is adequate thinning, started just after petal fall. Other aids include adequate manuring and mulching, light winter pruning and summer tipping.

131. Fritzsche, R. 634.1/2-1.542
Das Schröpfen der Obstbäume. **(Slitting the bark of fruit trees.)**
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 171-2.
Slitting the bark may promote secondary growth in young, vigorous fruit trees and thereby benefit the whole development of the tree. The treatment has proved particularly effective after a temporary stoppage of growth following transplanting or root damage. In such trees the bark tissue tends to harden and is liable to burst possibly at an unfavourable time of year. In order to relieve the tension of the bark in pome fruit, perpendicular cuts 8-12 in. long, are made over the whole length of the trunk, extending to the underside of the main limbs. The cuts, which should overlap by about 2 in., should be made on the shaded side of the tree. In stone fruit the cuts are shorter and oblique. The end of May is recommended as the best time for carrying out the operation in Switzerland.

132. Edgerton, L. J. 634.11: 577.17
A method for evaluating the effectiveness of growth substances in delaying apple abscission.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 42-4, bibl. 4.
Tests with two esters of 2,4-dichlorophenoxyacetic acid showed that these substances had little effect in checking fruit drop in McIntosh, although they were quite effective on the petioles of Stayman and Winesap.—Ithaca, N. York.

133. Batjer, L. P., and Thompson, A. H. 634.11: 577.17
Further studies with 2,4-dichlorophenoxyacetic acid sprays in retarding fruit drop in Winesap apples.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 45-8, bibl. 3.
Tests showed that 2,4-dichlorophenoxyacetic acid is extremely successful in preventing pre-harvest drop of Winesap apples. Refinements in treatment are discussed.—Wenatchee, Wash.

134. Marth, P. C., Havis, L., and Batjer, L. P. 634.25: 577.17
Further results with growth regulators in retarding flower opening of peaches.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 49-54, bibl. 3.
Disappointing results followed the spray application of the

sodium or potassium salt of naphthaleneacetic acid to Elberta peach trees in August, September and October in an attempt to delay flower opening the following year. In the best results opening was delayed only 2 days. Further, the delay was associated with injury to leaves, buds, flowers and branches. The growth of vegetative buds was moderately to severely retarded on treated branches.—Beltsville, Md.

135. Marsh, R. S., and Taylor, C. F. 634.11-2.954
Observed residual effects on apples of 2,4-D in a central spray system.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 59-62.

The use of Weedone (2,4-D) as an eradicant spray against poison ivy resulted in fruit and foliage in Winesap and Stayman apple trees remaining tenaciously on the trees and in a delay in blossoming of 7-10 days the following spring. Various features are discussed and the conclusion is reached that the cumulative effect of 2,4-D over a period of years may result in tree injury.—Morgantown, W. Va.

136. Smock, R. M., and Gross, C. R. 634.11: 577.17
The effect of some hormone materials on the respiration and softening rates of apples.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 67-77, bibl. 9.

The results of this investigation tend to support the findings of Gerhardt and Allmendinger that hormone sprays may directly stimulate the respiration and ripening rate of apples. In three out of four years some stimulatory effect of such sprays was noted. The magnitude of such an effect would seem to depend on the following factors: 1, the season; 2, the variety; 3, the concentration of hormone material used; 4, the number of applications made; and 5, the temperature at which the apples are held. The effects of such sprays are much more apparent at high temperatures (74° F.) than at low (33° F.); 6, the interval between spraying and harvesting. Gerhardt and Allmendinger and Allen and Davey have pointed out that such direct stimulatory effects were not noticed until about 2 weeks after spraying. This study had shown that such an effect may be noted within 3 days after spraying on some varieties in some seasons. This report and that of others emphasize that if apples are sprayed with abscission-delaying sprays the harvesting season should not be delayed too long after spraying. If high concentration sprays or repeat sprays are used and if the harvesting period is very much extended, the sprayed fruits should not be stored too long. Before dip treatments of α-naphthaleneacetic acid are recommended for scald control, their effect on ripening should be fully examined. This study showed that such treatments may stimulate ripening at a high temperature (74° F.). [Authors' summary.]—Ithaca, N. York.

137. Hamner, C. L., and Rasmussen, E. J. 634.11: 577.17
The fog machine for applying pre-harvest drop materials to apple trees.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 78-80, bibl. 3.

A short account of the successful application by the " Todd Insecticidal Fog Applicator " of naphthaleneacetic acid as a pre-harvest spray to prevent drop of Oldenburg apples. The fog's uncontrolled drift is a limiting factor on its use by fruit growers.

138. Evreinoff, V. A. 634.1/2: 577.17
L'effet des hormones sur la chute des fruits.
(The effect of hormones on fruit fall.)
Rev. hort. Paris, 1947, **119**: 285-6.

An account of controlled tests of two proprietary hormones on the pear variety Beurré Clairgeau at Toulouse in 1946. The results were very favourable, but two criticisms are made: the high cost of the hormones and the fact that the hormone spray must be directed on to the peduncle of the fruit, a slow operation demanding accuracy.

139. Lott, R. V. 634.11: 577.17
The effect of hormone sprays upon maturation, ripening, color, and edible quality of apples.
Trans. Ill. St. hort. Soc. for 1946, 1947, pp.76-83, bibl. 9.

After defining maturation and ripening the author enumerates the physiological activities which affect fruits during these two periods. The available information on the physiological effects of hormone sprays (N.A.A. and 2,4-D) on apples, particularly on colour development, are then briefly summarized and discussed. The possibility of these sprays being toxic to man is mentioned.—Illinois.

140. Gayford, G. W. 631.541.27: 634.1
Blossom removal sprays.
J. Dep. Agric. Vict., 1947, **45**: 419-20.

In connexion with biennial cropping of apples and pears, experiments with sprays to remove blossoms have indicated how growers can de-blossom part of their orchards in a heavy cropping year and obtain good yields in the following year when the crops are generally light. Three materials effective for blossom removal are cresylic acid, tar distillate and sprays containing DNC. The best time to apply these materials is when 25 to 50% of the blossom buds are in full bloom.

141. Hoffman, M. B. 634.11-1.542.27
Further experience with the chemical thinning of Wealthy apples during bloom and its influence on annual production and fruit size.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 21-5, bibl. 2.

It had already been shown that dinitro-o-cresol spraying at blossom time resulted in increased size of fruit and a more annual habit in Wealthy apple trees [*ibid.*, 40: 95 and 42: 185; *H.A.*, 12: 1262]. Further tests in 1943 in Orange County, Hudson Valley, New York, with the same spray indicated that it should be possible to maintain the annual habit in Wealthy by such treatment, provided unfavourable weather does not interfere seriously with the date of the application. In most seasons under local conditions there is only one day when a single application reduces set satisfactorily, namely the first day of full bloom, or when nearly all the spur flowers have opened and before the anthers of the lateral spur flowers have started to shed pollen.

142. Flory, W. S., Jr., and Moore, R. C. 634.11-1.542.27
An early post-blossom thinning agent for York apples.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 33-4.

Kenworthy, A. L.
A spray mixture useful to thin apples after bloom.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 35-6.

Experiments at Blacksburg, Va, and in Delaware indicate the efficacy for apple blossom thinning of a mixture of polyethylene polysulphide (Goodrite p.e.p.s.) and a complex product formed by the reaction of zinc dimethyl dithiocarbamate (Zimate) and cyclohexylamine, applied 10-14 days after full bloom.

143. Hoffman, M. B., Southwick, F. W., and Edgerton, L. J. 634.11-1.542.27
A comparison of two types of materials for the chemical thinning of apples.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 37-41, bibl. 9.

Various dinitro sprays have been used with fair success for the thinning of apples on heavy setting varieties, but not so successfully on McIntosh, Delicious and certain others, the failure possibly being due to improper timing of the spray.

The sodium salt of naphthylacetic acid will cause the shedding of flowers during bloom and of young fruits at the calyx stage and later well past pollination. Factors of pollination, water supply, nitrogen, carbohydrates, etc., are likely to affect results with this substance, which is, however, distinctly promising and deserves prolonged trial.

144. Havis, L. 634.25-1.542.27
Studies in peach thinning.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 55-8, bibl. 3.
The main conclusion reached after tests with various strengths of Elgetol and with the wire brush method of thinning peaches is that while phytotoxic sprays may be of value in areas relatively free from late spring frost, the results seem to vary considerably from year to year.—Beltsville, Md.

145. Southwick, F. W., Edgerton, L. J., and Hoffman, M. B. 634.25-1.542.27
Studies in thinning peaches with blossom removal sprays.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 26-32, bibl. 7.
All the materials tested, especially 40% dinitro-ortho-cyclohexylphenol, proved satisfactory for blossom thinning peaches at approximately full bloom in New York State.

Noted.

146.

a Evreinoff, V. A. 634.25: 581.46
Sur quelques anomalies de la floraison chez le pêcher. **(Abnormal flowering of the peach.)**
Rev. hort. Paris, 1947, **119**: 213-6, bibl. 16.

b Gayford, G. W. 634.1/8-1.62
Orchard drainage.
J. Dep. Agric. Vict., 1947, **45**: 308-9, illus.

c McClintock, J. A. 634.11-1.541.11
A strain of McIntosh compatible with Virginia crab stocks.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 181-2, bibl. 3.

d McCrory, S. A. 634.1/8(783)
Varieties of fruit for South Dakota.
Circ. S. Dak. agric. Exp. Stat. **61**, 1946, pp. 4.

e Moore, R. C., and Flory, W. S., Jr. 634.25
Leaf gland inheritance in seedlings of Lovell and several varietal hybrid peach populations.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 158-60, bibl. 4.

f Horticultural Division N.Z. Department of Agriculture. 634.11: 351.823.11
New Zealand grown fruit regulations—1940. Synopsis of amended grading standards for apples.
Orchard. N.Z., 1946, Vol. **19**, No. 2, supplement, 1p.

g Schmid, W. 634.1/8(494)
Die Verhältnisse im st. gallischen Obstbau. **(Fruit growing in the canton of St. Gallen.)**
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 239-43.

h Schweiz. Bauernsekretariat. 634.1/8(494)
Rentabilität in der schweizerischen Landwirtschaft im Erntejahr 1944/1945 (1 März 1944 bis 28 Februar 1945). II. Teil. **(The economics of Swiss agriculture in the harvest year 1944/1945 [1.3.44-28.2.45]. Part II.)** [In German and French.]
Landw. Jb. Schweiz, 1947, **61**: 251-380.
Includes fruit and vine growing.

i Simonet, M., and Chopinet, R. 634.37
Le figuier à Solliès-Pont (Var). **(Fig varieties grown at Solliès-Pont, Var.)**
Rev. hort. Paris, 1946, **118**: 66-9, bibl. 2 [received 1947].

j Terrier, C. 634.1/7(494)
Der Obstbau im Wallis. **(Fruit growing in the Valais.)**
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 219-25.

k Tomalin, T. E. 634.25-1.544
Fruit under glass. III. Peaches and nectarines.
The fruit year book 1947, R.H.S. Lond., No. **1**, pp. 74-6.

SMALL FRUITS, VINES AND NUTS.

Small fruits.

147. Raphael, T. D. 634.7(334.6)
Berry fruits by air—mainland markets.
Tasm. J. Agric., 1947, **18**: 52-9, bibl. 3.
A complete range of commercial berry fruits was sent by air from Hobart to Sydney during January and February. All fruit carried uniformly well with the exception of raspberries, loganberries, one lot of strawberries and one bulk lot of black currants. As air freight represents a high proportion of the marketing costs the weight of packages and containers should be reduced as much as possible. A ratio of at least 6 of fruit to 1 of package is desirable.

148. Ballantyne, J. A. 634.71
The youngberry and boysenberry. Introduced berry fruits of value.
Agric. Gaz. N.S.W., 1947, **58**: 479-82.
Of the various recent berry plant introductions into New South Wales the youngberry and boysenberry are of sufficient worth to warrant retention and should be cultivated by growers who have small areas of land near cities or country towns. Their propagation, planting, pruning and training are described, with notes on irrigation and crop yields.

149. Wright, P. H. 634.711
The adaptations of the raspberry.
Canad. Gr, 1947, **70**: 7: 7, 15.
A discussion of the difficulties in growing raspberries in the dry western prairies. Conditions may be improved by providing shade in the summer, removing all unwanted suckers, and mulching deeply towards the end of the rainy season in July.

150. Hudson, J. P. 634.711
The story of a raspberry variety.
N.Z. J. Agric., 1947, **75**: 179-80.
Describes the recognition in New Zealand of virus-free plants of the Lloyd George raspberry, and of the introduction into Britain of this disease-free strain to replace the virus-infected stocks at present being grown in Britain.

151. Watt, J. H. 634.711
Reasons for decline in raspberry crops.
N.Z. J. Agric., 1947, **75**: 11-14.
The sub-title of this article is, " Production can be increased by disease control and methods of culture ", and it is stated that there are ample stocks of good varieties in New Zealand from which it will be possible to supply all the canes needed to increase production, if precautions are taken to control the diseases and pests here described. Fungus diseases can be checked if adequate garden hygiene is adopted. The main fault in this respect is insufficient pruning, as stubs of dead cane up to 9 in. long are prevalent, and on these fructifications of cane wilt, cane spot and silver leaf fungi abound.

152. GRUBB, N. H., AND HARRIS, R. V. 634.711
The " Malling Notable ".
Fruitgrower, 1947, **104**: 744.
New raspberry—" Malling Notable ".
Grower, 1947, **28**: 757.
Raspberry Malling Notable.
Gdnrs' Chron., 1947, **122**: 220.
Seedling 32/163 bred at East Malling and sent out for trial as Malling N has now been named Malling Notable. Good reports have been received, particularly from Scotland. The fruit is round, of fair quality, and travels well. The variety is not very susceptible to raspberry midge and cane blight at East Malling; but, apart from virus-free canes in Scotland, much of the stock carries mild Mosaic 2 virus.

153. VAARAMA, A. 576.3/2.35: 634.723
Morphological and cytological studies on colchicine-induced tetraploid *Ribes nigrum*.
Suomen Maatalousk. Julk. (*Acta agralia Fennica*), 1947, **67**: 55-92, bibl. 58.
Comparisons were made between 5 different strains of the autotetraploid *Ribes nigrum* and the black currant variety Brödtorp. Seed formation in the autotetraploids is lower than in the diploid, but germination may be higher and more rapid. The tetraploid fruits are usually larger and more strongly flavoured than the diploid; the ascorbic acid content is somewhat lower. There is considerable variation within the five tetraploids studied.—State Horticultural Institute, Piikkiö, Finland.

154. HUDSON, J. P. 634.723-2.19
Causes of " running off " in black currant crops.
N.Z. J. Agric., 1947, **74**: 581-2.
The causes of " running off " in black currants are discussed. True running off is a result of imperfect pollination, and the importance of pollination by bees is stressed.

155. HUNTER, A. W. S. 634.723-1.521.6
Rustless black currants.
Canad. Gr, 1947, **70**: 6: 8, 26.
Plants of two seedlings resistant to currant rust at Ottawa [see *H.A.*, 16: 1212] have been widely distributed in Canada; no infection has been reported in their first season of growth.

156. BAILEY, J. S. 634.73
Development time from bloom to maturity in cultivated blueberries.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 193-5, bibl. 7.
The determination of the time elapsing between bloom and maturity in cultivated blueberries is made extremely difficult by the problem of determining the limits of the period, whether measured from full bloom to first picking or from first open blossom to first ripe fruit. It is too variable to be used for estimating picking dates.

157. MEADER, E. M., AND DARROW, G. M. 634.73: 581.162.3
Highbush blueberry pollination experiments.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 196-204, bibl. 6.
Three years' trials at Beltsville, Md, with 15 high bush varieties showed that cross-pollination usually increased the crop sufficiently to warrant the inter-planting of two or more varieties.

158. CHANDLER, F. B. 634.73
Cultivation of low-bush blueberries.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 205-7, bibl. 2.
The author summarizes his trials at the Maine Agricultural Experiment Station as follows:—" The low-bush blueberry may be cultivated by incorporating cover crops and peat in the soil. The plants should be burned when set and not oftener than every 3 years thereafter for the best spread of plants. Selections to be used for cultivation should spread well, produce a large number of stems and be affected as little as possible by burning, in addition to having good fruit characters."

159. CHILDS, W. H. 634.73
Influence of fineness of shredding on value of sphagnum as a medium for transplanted blueberry seedlings.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 208-10, bibl. 4.
Trials at Morgantown, W. Va, with over 900 blueberry seedlings showed that there was no difference in linear growth in plants grown in sphagnum passed through screens 2, 3, 4 and 6 meshes to the inch, but growth was not quite so good in sphagnum screened through 16 meshes to the inch. Peat as an alternate medium was slightly inferior to all the sphagnum media except the last.

160. CHRISTOPHER, E. P., AND SHUTAK, V. 634.73
Influence of several soil management practices upon the yield of cultivated blueberries.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 211-2, bibl. 2.
Trials in Rhode Island laid down in 1942 indicated strongly in 1945 and 1946 that for blueberries a sawdust mulch is superior to clean culture and cover crop of buckwheat, straw and hay mulch, and clean cultivation.

161. GRIGGS, W. H., AND ROLLINS, H. A. 634.73
The effect of planting treatment and soil management system on the production of cultivated blueberries.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 213-8, bibl. 11.
Trials with highbush blueberry were initiated with 3 varieties at Storrs, Conn., in 1941, where they were planted in soil with or without admixture of peat moss. They were clean cultivated during their first growing season and were thereafter submitted to clean cultivation, sawdust mulch or hay mulch. There were no significant differences in yield until 1946. In comparison with either clean cultivation or hay mulch, sawdust mulch gave greater yields and longer shoot growth. Treatment with peat at planting increased yields in 1944 but otherwise had no apparent effect. More plants survived under clean cultivation than under either of the mulches.

162. KRONENBERG, H. G. 634.75(492)
Selectie van aardbeien op gezondheid. **(Selection of healthy strawberries.)**
Meded. Inst. Vered. Tuinbgew., Wageningen, **4**, 1947, pp. 66-8.
Healthy material for planting in the main strawberry growing districts of Holland is now largely produced elsewhere by specialist growers. The multiplication plots should be isolated from other strawberries (300 m. for class AA). The soil should be suitable for vigorous growth. The climate should be severe so as to reduce the spread of disease by aphids.

163. MORGAN, C. N. 634.75(943)
Strawberry culture [in Queensland].
Qd agric. J., 1947, **65**: 130-9, illus.
A practical article covering choice of site and soil, preparation of land, manuring, planting material, planting, cultivation, irrigation, mulching and harvesting. Strawberries in Queensland are grown as an annual crop: only rarely is a second season's crop taken. The main varieties grown are Phenomenal and Aurie, both self-fertile and both suitable for the fresh fruit trade or for processing.

*Vines.**

164. REBOUR, H. 634.8
Le 3me Congrès International du Raisin, du Jus de raisin et du Vin. **(The 3rd International Grape, Grape Juice and Wine Congress.)**
Fruits d'Outre Mer, 1947, **2**: 373.

* See also 498.

A brief account of this Congress, which was held at Istanbul from 2 to 7 October, 1947. The main findings were as follows: Most varieties of grape are so restricted in range of successful growth that introductions are unlikely to be successful; exceptions are Chasselas doré de Fontainebleau and Dattier de Beyrouth, which are widely grown in several countries. The most vigorous plants are generally used for propagation, and these are not always the most fruitful. For growers in France Professor Branas recommended dual purpose varieties such as Chasselas, Gros-Vert, and Servan, in preference to less hardy varieties more suited to southern countries. In processing grape juice the use of SO_2 is being replaced by other methods of preservation, such as pasteurization. Turkey is now an important vine-growing country. More than a third of her production of grapes is dried and a like amount goes to make concentrated juice. Wines and liquors are produced there on a small scale.

165. Brock, R. B. 634.8(42)
Can we grow grapes as an outdoor crop [in England] ?
Grower, 1947, **28**: 728-31, illus.
"Extensive vineyards existed in England for hundreds of years, but there is no evidence as to why they gradually ceased, and so far nothing can be found about the methods of cultivation." The author discusses the subject and describes his recently established trial of outdoor grapes in southern England.

166. Aubin, L. 634.8: 634.25
La vigne en culture dérobée. **(The vine as a catch crop.)**
Rev. hort. Paris, 1945, **117**: 196-7 [received 1947].
Grapes may be grown as horizontal cordons at the top of a wall against which peaches are planted as espaliers.

167. Leyvraz, H. 634.872
Expériences dans la culture des raisins de table. **(Table grape trials.)**
Rev. romande Agric. Vitic., 1946, **2**: 83-5, 91-2.
A preliminary account of variety trials with table grapes in three vineyards in Switzerland with brief descriptions of the varieties. The first article discusses white, the second red, grapes.

168. Ioffe, G. 634.8(477)
Viticultural organization in the Crimea. [Russian.]
Social. Seljsk. Hoz (Socialist Agriculture), 1947, No. 3, pp. 34-8.
By 1941 the total area under vineyards owned by 530 collective farms in the Crimea was 10,786 hectares, and the average yield was 50·3 centners per hectare in 1939; in individual vineyards maximum yields were 77·9 centners per hectare. During the war both area and yields fell. In the reconstruction period the area under vineyards, mainly for wine making, will be greatly enlarged. It is calculated that each collective farm with an arable area of 1,200-1,400 hectares and a population of 250-300 men can allocate about 50 hectares for the vineyard, where not more than 5 varieties should be grown. Some information is given in the concluding section of the paper on density of planting and organization of labour in vineyards.

169. Bottini, O., and Venezia, M. 634.8
Il Cesanese di Piglio. **(The Cesanese vine of Piglio.)**
Ann. Fac. Agrar. Portici, 1942/43, Ser. 3, **14**: 74-121 [received 1947].
A detailed description is given of a very notable vine variety of Central Italy from which a deep red wine, very popular at Rome and Fiuggi, is made. The sub-variety now chiefly used is Cesanese di Affile. The characters of the wine are also considered.

170. Leyvraz, H. 634.8: 634.836.72
Reconstitution du vignoble romand et choix des porte-greffes. **(The reconstitution of vineyards in French Switzerland and choice of rootstocks.)**
Rev. romande Agric. Vitic., 1946, **2**: 2-4.
A discussion of phylloxera-resistant stocks and their suitability for particular soils. Rip.×Rup. 3309 receives very favourable mention.

171. Anon. 634.8-1.535
Relations entre le longueur et le comportement de boutures de vigne. **(The relation between length of vine cuttings and their behaviour.)**
(*Mim. Publ.*) *Serv. Hort., Rabat*, 1947 [?], pp. 4, bibl. 1.
In a preliminary experiment, using Chasselas de Fontainebleau, vigorous, well-rooted plants were produced by cuttings having only one bud.

172. Cunin, G. 631.541: 634.8
La greffe Mayorquine. **(The Mayorquine graft.)**
Fruits et Prim., 1947, **17**: 324-7.
Detailed instructions are given for grafting the grape-vine from the preparation of the rootstocks to the first pruning of the grafted vine. The Mayorquine graft resembles chip-budding.* It is carried out in late summer or early autumn. See also *H.A.*, 17: 2033.

173. Vaz, J. A. T. 634.872-1.542
A importância da poda em verde na cultura da uva de mesa. **(Pruning green shoots of table grape vines.)**
Bol. Junta nac. Frutas, Lisbon, 1947, **7**: 16-35.
The three most important operations in the early stages of vine growth are tipping, ringing and thinning. Tipping, if carried out just before flowering, is effective against the early dropping of flowers and fruit caused by deficient nutrition. Its effect is not so much on the control of fruit drop as on flower fall, and results, in some cases, in the ripening of four times as many grapes as on vines not treated.

174. Flanzy, M. 634.8: 581.192
Le potassium dans le cep de vigne. **(The distribution of potassium in the vine.)**
Ann. agron. Paris, 1947, **17**: 545-63, bibl. 27.
The author analyses data from various sources on seasonal changes in the distribution of potassium in the vine. The concentration of K in the fruit increases rapidly towards maturity, but not at the expense of the leaves and young shoots; the mature stem may be the potassium reserve, as it is rich in this element in winter. The effect of potassium on the tartar index is discussed, and it is emphasized that knowledge of the variations in osmotic pressure affecting potassium distribution are little known.—Station de Recherches Viticoles et Oenologiques de Narbonne.

175. Ulrich, A., Jacobson, L., and Overstreet, R. 634.8-1.85
Use of radioactive phosphorus in a study of the availability of phosphorus to grape vines under field conditions.
Soil Sci., 1947, **64**: 17-28, bibl. 5.
Phosphoric acid tagged with radioactive phosphorus was applied by two methods (to the surface and at a depth) to a loam soil which possessed a high phosphate-fixing power and supported grape vines low in soluble phosphorus. The radioactive analysis of the plant samples of the deep placement indicates that small amounts of phosphate were taken up and translocated throughout the vines within 40 hours of the application of the phosphoric acid, whereas vines receiving the surface application had relatively small radioactivities in the blades and apexes of the canes. Less than 1% of the phosphorus added to the soil was contained

* See Garner's *The Grafter's Handbook*, p. 109.

in the aerial part of the vines. Radioactive measurements of plant samples from vines only 3 to 4 feet from the point of fertilization indicated that there were no active roots at even this short distance. [From authors' summary.]

Nuts.

176. Batchelor, L. D., Braucher, O. L., and Serr, E. F. 634.51(794)
Walnut production in California.
Circ. Calif. agric. Exp. Stat. **364**, 1945, pp. 34, bibl. 8.
A complete guide for the grower, from the selection of varieties and rootstocks to packing. In California the chief climatic hazards are frosts, summer heat, and insufficient chilling in winter. In addition to the French varieties, Franquette and Mayette, many local varieties have been developed from the Santa Barbara soft-shell type. The technique of grafting walnuts is described.

177. Chase, S. B. 634.51-1.541
Budding and grafting eastern black walnut.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 175-80, bibl. 6.
Four methods of spring budding black walnut were compared. Skin budding on dormant stocks resulted in poor survival. There was no significant difference between patch budding and skin budding on actively growing stocks. Patch budding was found to be the best and fastest method. Shield budding was almost a complete failure. Completely waxing buds after tying showed no advantage. Cold weather and bleeding of stocks are offered as causes of bud failure. Budding resulted in only approximately half the survival secured by grafting. The position of the top scion bud had no effect on the survival or growth of black walnut grafts. Growth of shoots from the top buds was more vigorous than from other buds regardless of their position. One- and two-bud scions produced more desirable trees than longer scions. [Author's summary.]—Norris, Tenn.

178. Reed, C. A. 634.53
The 1946 status of Chinese chestnut [*Castanea mollissima*] growing in the Eastern United States.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 139-46, bibl. 6.
The author states that the Chinese chestnut is unexcelled in sweetness and palatability by any other known chestnut. The environment necessary for it to thrive is much the same as for peaches. Most of the trees so far grown in the U.S. since its introduction in 1906 are seedlings, which are poor producers and give a small nut. Varietal selections of much promise are being made by the Bureau of Plant Industry, Soils and Agricultural Engineering. Sample methods of curing and storing will allow the nuts to be kept successfully for eating or sowing for several months. When available, cold storage at temperatures just above freezing is the most satisfactory method. All pests and diseases are easily controlled.

179. Vénot, P. 634.53-1.541.11
À la recherche d'un porte-greffe du châtaignier.
(Finding a stock for the chestnut.)
Rev. hort. Paris, 1947, **119**: 366-9, illus.
Written mainly from the forestry standpoint, but also of interest to nut growers. The possibility of using various stocks is discussed including: *Quercus* spp., *Castanopsis chrysophylla*, Japanese and indigenous chestnuts. There is a note on crossing exotic and indigenous chestnuts.

180. Commission du Châtaignier. 634.53-1.556.1
Prescriptions essentielles relatives aux châtaignes.
(Harvesting and storing chestnuts.)
Rev. hort. Paris, 1944, **116**: 143-4 [received 1947].
Harvesting.—This should be as thorough as possible, and all fruits, including those infested with worm, should be removed; much of the young wood can be cut back to the framework. Grading.—Wormy fruits may be separated by flotation, and should be cooked and fed to livestock. Sound fruit should be dried. Storage.—The fruits may be stored in sand, or dried by sun, smoke, or in a drier. Disinfection may be necessary to control fungus diseases.

181. Guillaume, A. 634.53-1.556.1
Sur la récolte et le traitement des châtaignes.
(Harvesting of chestnuts and their subsequent treatment.)
C.R. Acad. Agric. Fr., 1947, **33**: 419-22.
The author deplores the scarcity of chestnuts on the French market; they fall to the ground and are left there to rot, or when they are collected they become spoiled by insect larvae or fungi. He points out their nutritive value, urges their collection, and suggests methods for treating them to prevent wastage.

182. de Almeida, C. R. M. 634.55: 581.162.3
Acerca da improdutividade na amendoeira.
(Unfruitfulness in the almond.) [English summary 6 pp.]
An. Inst. sup. Agron. Lisbon, 1945, **15**: 1-184, bibl. 311 [received 1947].
Cropping in almonds is irregular and in some varieties the yield is very low. This is usually attributed to the almost complete self-sterility of the species so that good pollinizers are necessary. The problem is studied in the present work on cytological and genetical lines, and discussed, after an introduction, under (*a*) The problem of unproductiveness, (*b*) Unproductiveness in the almond as determined by floral anomalies or sterility of gametes, and as a result of incompatibility of the gametes. Conclusions of considerable interest to the breeder are reached.

183. Gayford, G. W. 634.55: 581.162.3
Almond pollination.
J. Dep. Agric. Vict., 1947, **45**: 307.
The most frequent cause of unsatisfactory cropping of the almond is inadequate cross-pollination. To ensure cross-pollination, alternate double rows of different varieties which blossom at approximately the same time should be planted, or the planting should be so arranged that each tree has a pollinizing variety adjacent to it, the pollinizer being every third tree in every third row starting with the second tree of the second row. A list is given of combinations recommended as suitable for cross-pollination. The introduction of hives at the rate of one per acre is advised.

Noted.

184.

a Amelinckx, F. 634.51
Juglans nigra L. (swarte noot). Een goede boomsoort voor wegenbeplanting. **(The black walnut, a good roadside tree.)**
Cultuur Hand., 1947, **13**: 5: 19.

b Branas, J., Bernon, G., and Levadoux, L. 634.8-1.542.11
Les porte-greffes en viticulture. **(Vine rootstocks.)**
Ann. Épiphyt., 1939, **5**: 461-535, bibl. 380 [received 1947].—Montpellier.
A notable contribution.

c Darrow, G. M., Williams, C. F., and Waldo, G. F. 634.715
Breeding studies in Eastern States with the Western Trailing blackberries.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 186-8.

d Evreinoff, V. A. 634.722
Origine et ancêtres de nos groseilliers à grappes.
(The evolution of red currants.)
Rev. hort. Paris, 1945, **117**: 203-5 [received 1947].

e ROSE, F. J. 634.8-1.544
Fruit under glass. I. Grapes.
The fruit year book 1947, R.H.S. Lond., No. **1**, pp. 69-72.

f YARNELL, S. H., AND BLACKHURST, H. T. 634.715
A polyploid chromosome series from a cross of the Lawton blackberry and the Nessberry.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 189-92, bibl. 5.

PLANT PROTECTION OF DECIDUOUS FRUITS.

General.

185. BRIEN, R. M. 632.1/4: 632.8(931)
Second supplement to "A list of plant diseases recorded in New Zealand".*
N.Z. J. Sci. Tech., 1946, **28**, Sec. A, pp. 221-4, bibl. 19.
In this list are recorded 54 diseases of fungous, bacterial, virus and physiological origin from 56 host plants; among them are mentioned *Verticillium dahliae* on apricot (additional host record), black spot (*Xanthomonas pruni*) on peach, and *Schizophyllum commune* and green crinkle (physiological) on apple.

186. LENFANT, J. 634.2-2.3/8
Les arbres à fruits à noyau et les soins d'hiver. **(The winter care of stone fruit trees.)**
Prog. agric. vitic., 1947, **128**: 249-52.
The chief pests and diseases of apricot, cherry, almond, peach and plum are enumerated, and recommendations given for their control.

187. DE ROPP, R. S. 632.3: 632.8
Plant tumours and animal cancer.
Nature, 1947, **160**: 780-2, bibl. 22.
The author reviews work on plant tumours and points out that the three factors—virus, hormone and genetic—producing pathological growth in plants have their counterparts in animal cancer.

188. JØRSTAD, I. 634.7(481)-2.3/4
Melding om plantesykdommer i land- og hagebruket. Sykdommer på baervekster. **(Report on plant diseases in agriculture and horticulture in Norway. Diseases of small fruit.)**
Being Supplement C of *A.R. Dir. Agric. Oslo, 1941*, 1942, pp. 34, bibl. 70 [received 1947].
The occurrence and development of red and black currant, gooseberry, raspberry, grape and strawberry diseases in Norway are described.

189. ANON. 634.75(492): 351.823.1
Keuringsvoorschriften voor de aardbei 1947. **(Instructions for inspecting strawberries [in Holland] 1947.)**
Publ. (out of series) N.A.K.B. Nederland, 1947, 3rd impression, pp. 8.
These instructions for the inspection of strawberries were drawn up in 1946 by the Strawberry Commission of the Nederlandsche Algemeene Keuringsdienst voor Boomkweekerijgewassen (the Netherlands general inspection service for fruit plants), the inspections to be directed towards the purity of the varieties and the freedom from pests and diseases, viz. virus diseases, rootrot, canker, strawberry mite, eelworm, June yellows, *Diplodina*, leaf spot diseases, mildew and red spider.

190. ZILLIG, H. 634.8-2.95
Rebfeinde vernichten einen Jahrhundertwein. **(Pests and diseases wreck promise of superb vintage.)**
Festschr. O. Appel, biol. Zentralanst. Land-u. Forstwirtsch., Berlin-Dahlem, 1947, pp. 51-2, bibl. 1.
The summer of 1945 promised a vintage of rarest quality in the Rhine and Moselle valleys surpassing anything harvested in this century. However, post-war conditions generally prevented the spray programme from being carried out, with the result that the grapes fell victim to pests and diseases. In the vineyard strict adherence to the spraying calendar is anything but a luxury.

191. CENTRAALBUREAU VOOR SCHIMMELCULTURES, BAARN. 632.4
List of Cultures.
Koninklijke nederlandsche Akademie van Wetenschappen, Amsterdam, 1947, 146 pp.
Mycologists will be interested and relieved to know that a new "List of Cultures" has been issued by the Centraalbureau voor Schimmelcultures directed by Dr. Joh[a] Westerdijk. The collection survived the adverse war conditions, although difficulties were encountered such as the lack of many essential ingredients for the culture media. Since the war 565 species, including 17 yeasts, have been added to the collection, but certain deteriorated strains had to be discarded.

Deficiencies.

192. ROBERTS, W. O., AND LANDAU, N. 632.19: 634.1/7
Multiple mineral deficiencies in fruit trees: injection as a first aid treatment.*
J. Pomol., 1947, **23**: 80-91, bibl. 6.
Solid injection was used experimentally as a first aid treatment to combat a serious and widespread attack of die-back in apple trees due to multiple deficiency of potassium and one or more of the trace elements manganese and iron. Experimental injections of the necessary nutrients into apple trees brought about an improvement in foliage colour and an increase in the potassium content of the leaves. Injection of the deficient trace element alone seemed to bring about an even greater increase in the potassium content of the leaves, and the injection of a deficient trace element plus a potassium salt led to a greater increase in potassium content than that following the injection of a potassium salt alone. Injections of manganese salts alone or combined with a potassium salt caused an increase in the manganese content of the leaf. [Authors' summary.]—East Malling Res. Stat., Kent.

193. MASSIBOT, J. A., AND DUMAS, J. 631.589
L'injection de substances dans les plantes. **(Plant injection.)**
Fruits d'outre Mer, 1947, **2**: 281-90, 318-29, bibl. 7, illus.
A general introduction to the subject followed by theoretical consideration of the various methods for injecting leaves, branches and whole trees. Instructions are then given for carrying out the various injection methods with details of the apparatus and materials required, taken almost entirely from Roach's publications.

194. LEVY, B. F. G. 634.11-2.19
Preliminary experiments on the injection of individual apple fruits on the trees.
J. Pomol., 1947, **23**: 134-6, bibl. 2, illus.
In preliminary experiments with dye solutions individual apple fruits were injected whilst on the tree. Injection through the cut end of a leafy shoot arising near the base of a bourse bearing a fruit resulted in total permeation of that fruit. Injection through a secondary shoot arising on the same bourse as the fruit, resulted in the permeation

* The original list is noted in *H.A.*, 10: 98.

* See also 33.

of one or two sectors of the fruit only. The injection of nutrient solutions by either of these methods should prove of use in the study of physiological disorders in trees in the field. [Author's summary.]—East Malling Res. Stat., Kent.

195. KIDSON, E. B. 634.11-2.19
Mineral deficiency of apple-leaves: distribution of magnesia, potash and lime in the leaves of young shoots.
N.Z. J. Sci. Tech., 1946, **28**, Sec. A., pp. 173-82, bibl. 5.

An examination of the mineral composition of the current season's growth on Cox's Orange apple trees from three different localities in the Nelson district showed that the leaves varied in mineral content with position on the leader, and that where magnesium or potassium deficiencies occurred the element in low supply tended to be highest in the young leaves near the growing point when calculated as a percentage of the dry matter. In all cases the young growth had a lower calcium content than older leaves on the leader shoot. Changes in mineral content of the leader leaves are shown to have taken place during the season. Calcium tended to increase with age of the leaf. Trees deficient in either magnesium or potassium showed a decrease in the total content per leaf of the deficient element in the lower leaves of the leader as the season progressed, indicating a withdrawal, probably to supply the growing point of the shoot. The development of the fruit may also have made demands on these lower leader leaves. The appearance of magnesium-deficiency symptoms in Cox's Orange and Jonathan leaves was associated with a low content of this element (less than 0·14% MgO), but could not be correlated with any particular percentage of magnesium in the whole leaf. [Author's summary.]

196. LAPÉDAGNE, H. 634.25-2.19-1.541
Greffes d'amandiers par approche comme remède à la chlorose du pêcher. **(Inarching almond stocks to overcome peach chlorosis.)**
Rev. hort. Paris, 1946, **118**: 54-5 [received 1947].

Lime-induced chlorosis of peach on peach stock may be overcome by inarching almond stocks. Peach rootstocks should not be used for the peach on calcareous soils.

197. PEARSE, H. L. 634.7-2.19: 546.46
Marginal scorching and chlorosis of the leaves of berry fruits.
Fmg S. Afr., 1947, **22**: 742-5, 1 photograph.

A recently-observed disorder, which evidence goes to show is due to a magnesium deficiency accentuated by unbalanced potassium/magnesium nutrition.—W. Prov. Fruit Res. Stat., Stellenbosch, S. Africa.

198. REED, H. S. 632.19: 546.27
A physiological study of boron deficiency in plants.
Hilgardia, 1947, **17**: 377-411, bibl. 29.

Deals with the effect of boron deficiency in the olive, celery, radish and sunflower, with brief consideration of deficiency in some other plants.

Frost and climatic factors.

199. PLUTARCO, N. V. 632.111
Las heladas y la necrosis fria de las plantas. **(Frost and frost damage of plants.)** [English summary 2½ pp.]
Universidad Central, Quito, Ecuador, 1947, pp. 125, bibl. 66.

The author believes that frost damage to plants is caused not by the freezing and subsequent thawing of cell sap, but by the coagulation of amphoteric colloidal complexes in the protoplasm when these reach the isoelectric point. It is suggested that low temperature reduces the respiratory quotient by interfering with the chemical reactions concerned; that acids, which are metabolised endothermically at normal temperatures, accumulate; and that a change of −1 in the pH value of the cells is enough to bring the colloids to their isoelectric point. Three ways of reducing frost damage in Ecuador are suggested. (1) Radiation frosts can be predicted and minimized by artificial smoke clouds. (2) Copious watering before and at the time of the frost will reduce radiation and combat the physiological effect of frost upon the plant. (3) An institute of genetics should be established to produce frost-resistant varieties.

200. PROTZENKO [PROCENKO], D. F., AND POLISHCHUK [POLIŠČUK], L. K. 634.1/2-2.111
Determination of calorific value as a supplementary method for evaluating winter hardiness of fruit plants.
C.R. Acad. Sci. U.R.S.S., 1947, **55**: 769-72.

The calorific value of the stems and roots of a number of forest and fruit trees was determined. The material tested consisted of a mixture of finely ground paste prepared from small branches (or roots) of trees 1 to 3 years old, and burnt within a period from October to April. The maximum calorific value coincided with the coldest period of the winter season, and varied with the species or variety tested. From the results obtained it was concluded that the calorific value may serve as an index of the winter hardiness of a given species or variety.

201. WEST, C. E. 632.111
Study of frost damage.
Fruit World, Aust., 1947, **48**: 7: 20.

A brief account of the problem of radiation frost, as it affects the Murrumbidgee Irrigation Areas.

202. OSTERWALDER, A. 634.1/8: 632.111
Untersuchungen und Beobachtungen über die Entstehung von Frostschäden, insbesondere von Frühjahrsfrostschäden an Obstbäumen, Reben und einigen andern Pflanzen. **(Investigations and observations on the origin of frost injury in fruit trees, vines and other plants.)** [French summary ¾ p.]
Landw. Jb. Schweiz, 1947, **61**: 443-85, bibl. 9.

(1) Both in dry and wet plants the blossom was always found to be more frost-susceptible than the leaves, and the bottom part of the style, next to the ovary, more susceptible than anthers or petals. Dry cherry, apple and pear blossoms suffered damage when exposed to a temperature of −2·5 to −3·5° C. for 3 hours, whether open or closed. Of the leaves, as a rule, the youngest at the tip of the shoots froze first and turned brown at the margin or became spotted, whereas in autumn the older apple leaves are the first to suffer from early frosts, the younger leaves being affected only by temperatures of −6° C.
In dry vines, buds shortly before bursting can stand a temperature of −3 to −4° C. for 2½-16 hours, while young shoots were injured in 9 cases out of 20 when exposed to −2·5 to −4·5° C. for ¾ hour to 3 hours.
Of other plants the following were more or less severely damaged by a few hours' exposure in April or May to temperatures of approx. −3° C.: Leafy shoots of walnut, oak, elm, hazel, the ornamental shrubs spiraea, kerrea, *Pirus malus ussuriensis*, and *Allium ursinum* and rodgersia. Rhubarb leaves, tomato plants, *Alliaria officinalis*, strawberry plants and beech shoots remained uninjured.
(2) Wet plants are much more frost-susceptible than dry plants. Wet young vine shoots, for instance, were killed within 10 minutes at −4° C., while dry vine shoots can stand −4° C. for 30 minutes without suffering damage.
(3) Many gardeners hold that damage to frozen plants may be prevented by syringing them, as such treatment is supposed to cause slower thawing. However, this is wrong, since the plants thaw more quickly after syringing and quick thawing may be injurious. Similarly syringing frozen plants

with 2% salt water proved harmful. On the other hand, sprinkler irrigation of crops while the frost lasts deserves more attention, as experiments in Germany and in the Valais tend to show; but irrigation must not be discontinued during the period of frost, since according to our observations wet vine shoots may be killed partially or completely in 10 minutes.

(4) Mature apples vary in their behaviour towards frost, not only fruits of different varieties, but also apples of the same variety. As a rule, apples are not very frost-susceptible, and will stand −4° C. for 1-2 days without showing greater change than browning in the small veins of the pulp. The changes occurring in more severe frost, such as softening and browning of the pulp and the formation of acetic aldehyde, resemble those observed in certain apples in cold storage at temperatures of 1-3° C.

(5) The different theories on frost injury to plants are discussed. (*a*) The desiccation theory of Müller-Thurgau and Molisch; (*b*) the theory of Sorauer and Mez, with whom the author agrees. According to this theory plants suffer cold injury when the temperature sinks below their minimum requirements.

(6) In respect of frost injury and frost killing the concentration of the cell sap and the water content of the cells are of great importance, since cells having a concentrated cell sap, e.g. owing to a high sugar content, do not freeze so quickly as those having a high water and a low sugar content. Examples of this are cited.

(7) Our experiments have shown, in agreement with Müller-Thurgau, that the syringing of frozen plants causes quick thawing and thereby severe damage, if the frost has cooled the plant to near its critical temperature. The rate of thawing is of no significance in cases where (1) the plants have suffered severe damage by the frost and (2) where the plants have remained undamaged or the temperature has not approached the critical point.

(8) The formation of hoar frost on the plant is of the greatest significance, since, when it is thawed by the sun, heat is absorbed and consequently the temperature of leaves and shoots sinks still lower, possibly below the critical, i.e. fatal, temperature. [From author's summary.]—Wädenswil Research Station.

203. Bush, R. 634.1/8-2.111
Reducing frost damage.
The fruit year book 1947, R.H.S. Lond., No. **1**, pp. 20-2.

Frost damage in the fruit garden can be reduced by planting varieties that are inherently resistant, or flower late enough to escape the risk of frost. The smaller crops, and cordons of soft or pome fruit, may be protected artificially by reducing radiation. Straw or cloches may be used for strawberries. Hessian or fish netting should be draped over cordons.

204. Hassler, F., Hansen, C. L., and Farrall, A. W. 632.111
Protection of crops from frost damage by use of radiant energy—Part II.*
Quart. Bull. Mich. agric. Exp. Stat., 1947, **30**: 21-8.

Further work on three infra-red heaters is described. One heater radiated 46·5% of the energy generated. The type "B" unit has reflectors focusing the radiant energy at about 80 ft. and this gave the most uniform distribution. No frost occurred during blossoming at East Lansing in 1947, but tests were made earlier. When the official weather bureau temperature was 27° F. the orchard air temperatures were 21° F. at 4 ft. and 3° F. at 1 in. above the ground; in these circumstances frost was prevented on practically all branches and twigs within 100 ft. of the heaters. At distances of 60 ft. and more there was frost on the side away from the heaters of branches of ¾ in. diameter. Ground frost was prevented within 50 ft., and only light frost occurred up to 80 ft. from the heaters. "With high-value crops subject to serious damage from low temperatures of short duration protection will undoubtedly be practical."

* For part I see *ibid.*, 1946, 29: 53-63; *H.A.*, 17: 108.

205. Vitkevič, V. 632.111
Protection against frost damage. [Russian.]
Kolhoznoe Proizvodstvo (Collective Farming), 1946, No. 2-3, pp. 38-9.

Instructions are given for recording temperatures so as to predict when a damaging frost is imminent. This is followed by notes on orchard heating by smoke fires and by simple heaters, on methods of frost protection by increasing the atmospheric moisture and on protective hedges.

206. Leyvraz, H. 634.8-2.111
Protection de la vigne contre le gel. (**Frost protection of vines.**)
Rev. romande Agric. Vitic., 1946, **2**: 27-8.

A brief reference is made to frost protection by means of open fires, smoke screens, and oil heaters. A method of protection by means of paper—or (preferably) straw—hoods is described and illustrated; its advantages and disadvantages are pointed out.

207. Leyvraz, H. 634.8-2.111
Essais de traitements pour retarder le débourrement de la vigne en prévision du gel. (**Trials of methods for retarding vine bud development to guard against damage by frosts.**)
Rev. romande Agric. Vitic., 1946, **2**: 19-20.

Of various substances applied to vines to retard bud development, and so render the plants less liable to frost damage, the best results were obtained with lime-sulphur (32° B.) at 8-10% applied just before the buds grow out, when some of them are beginning to swell.

208. Leyvraz, H. 634.8-2.117
Taille de la vigne et lutte contre le gel. (**Pruning vines in relation to frost damage.**)
Rev. romande Agric. Vitic., 1946, **2**: 11-14.

The time of pruning vines is discussed in relation to liability to damage by late spring frosts. Early pruning (January) results in earlier bud and shoot development than late pruning (April), the earlier development rendering the plants more sensitive to frost damage. Results from pruning trials are tabulated and various types of pruning are illustrated.

209. Zimmerman, E. 632.13
Aktive Hagelabwehr. (**The active prevention of hail storms.**)
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 295-9.

In the author's view high-rising hail rockets are a suitable means of preventing hail from forming in a certain type of storm, the so-called heat storm (Wärmegewitter), and he suggests certain improvements in rocket construction. There should be at least one station per square km. on the more or less well known route of hail storms, a few stations here and there being worthless. The setting up of a hail warning service is demanded similar to the frost warning service established by the Central Meteorological Institute in Zürich.

210. Anon. 634.1/2-1.51: 551.5
Orchardists "tailor" weather.
Better Fruit, 1947, **42**: 2: 7.

Rain damage to ripening cherries may be reduced by blowing the water off them with powerful fans. Air blast sprayers may be used if the spray feed is cut off.

211. Dorsman, C. 632.181: 634/635
Schade aan tuinbouwgewassen ten gevolge van inundatie met zeewater. (**Damage to horticultural crops by inundation with sea water.**) [English summary 1 p.]
Tijdschr. PlZiekt., 1947, **53**: 65-86, bibl. 15.

Damage to horticultural crops by inundation with sea water

in the provinces of Zeeland and Western Noord Brabant is described. The damage was twofold, viz. the direct damage to the plant by poisoning and suffocation of the roots, and the indirect damage from the effect of the Na-ion on soil structure. The harm done to fruit trees depends on the duration of the inundation, the season in which it takes place, the salt percentage, the height of the water level, the character of the soil, species and variety of tree, rootstock and age of tree. The gooseberry, raspberry and stone fruits are most susceptible; the apple is less sensitive and the pear is the most resistant. Among vegetables the least sensitive are broad beans, cabbage, beetroot, radish, black radish, spinach and early potatoes, while gherkins, cucumbers, beans (excluding broad beans), peas and lettuce are very salt-sensitive.

212. FRITZSCHE, R., AND STAHEL, M. 634.1/2-2.112
Situationsbericht über die Trockenheitsschäden an Obstbäumen. (A survey of drought injury to fruit trees.)
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 382-7.

The exceptionally dry and hot summer of 1947 caused heavy damage to fruit trees in many parts of Switzerland. While the wilting of leaves is a direct result of drought, other symptoms, such as premature autumn colouring, partial leaf drop, and the dying back of leaf tips and margins is regarded as a symptom of famine caused by lack of water transporting the nutrients. That soil and general state of health should have a great influence on susceptibility to drought was to be expected, but it is interesting that trees with a top built up too lightly were much more affected than trees with a dense foliage shading all the limbs. Damage from aphids was much worse in 1947 than in a normal year, and excessive pre-harvest fruit drop, thought to be due to drought, was found to be caused by red spider. In the drought areas most trees formed a very large number of flower buds, requiring a generous application of manures by fertilizer lance in March. In the authors' view, the damaged trees will recover, provided they are given the right treatment and sufficient rain in winter and spring is forthcoming.

213. ATKINSON, J. D. 634.11-2.19
A note on crinkle* in New Zealand apples.
N.Z. J. Sci. Tech., 1947, **28**, Sec. A, pp. 332-4, bibl. 8.

Crinkle, a physiological disorder of apples which appears to be caused by high temperatures and drought, appeared in New Zealand in the summer of 1945-46. Affected fruit show external depressions and a shallow layer of necrotic tissue in the flesh.

214. TERRIER, C. 634.8-2.19
La coulure de la vigne. **(Running-off in vines.)**
Rev. romande Agric. Vitic., 1947, **2**: 68-70.

Bad weather during flowering in 1945 gave rise to running-off, the flowers dropping immediately after blossoming, and to failure of grape development, both generally attributed to lack of pollination. The most important factor in running-off is temperature, and it is shown that in the Chasselas variety the pollen grains do not germinate below 15° C., the optimum temperature being 27° C. and the maximum 33° C. Rain also influences pollination and is liable to wash pollen away and lower the concentration of sugar in the stigmatic secretion below that most favourable for pollen germination and growth of the pollen tubes. The remedy would appear to lie in selection.

Viruses and unknown agents.

215. SELMAN, I. W. 581.14: 632.8
The growth of the plant in relation to the incidence of virus infection. A survey of the literature.
J. Pomol., 1947, **23**: 50-62, bibl. 78.

A survey of the literature pertaining to the relationship between incidence of virus disease and the environment is presented. The field problem is considered under three heads: (*a*) Symptom suppression; (*b*) Animal vectors and the control of virus disease in the field; (*c*) The resistance of the plant to virus infection. It is pointed out that little critical work has been done on the problem of growing plants capable of resisting virus infection under field conditions, or on the parallel problem of growing plants that are relatively immune from insect attack. Evidence is adduced which strongly indicates that studies on these lines may offer a fruitful approach to the problem of virus disease control in the field. [Author's summary.]—Exp. Res. Stat., Cheshunt, Herts.

216. THUNG, T. H. 632.8
Antagonistische acties van viren. I. **(Antagonistic action of viruses. I.)** [English summary ¾ p.]
Tijdschr. PlZiekt., 1947, **53**: 43-8, bibl. 5.

Work on the antagonistic reactions of different plant viruses inoculated into the same plant is reviewed. Four types of interaction are mentioned, viz. (*a*) absolute dominance of one virus over the other, (*b*) partial dominance, (*c*) fixed equilibrium and (*d*) regulable equilibrium. The various combinations that are possible when two viruses are inoculated into the same plant are discussed.

217. ATKINSON, J. D. 634.11-2.8
Green crinkle* shown in New Zealand apple trees.
Orchard. N.Z., 1946, **19**: 5: 10-11, bibl. 3.

The disease is described and illustrated and compared with similar diseases previously described. Though the cause has not yet been determined, it is apparent that the trouble can be carried in the scion.

218. OLTARŽEVSKIJ, N. P. 634.25-2.8
Peach virus. [Russian.]
Priroda (Nature), 1947, No. 6, pp. 61-2.

A disease of peaches in certain parts of Russia produces the following symptoms. Affected branches bear narrow willow-like leaves which show a tendency to become folded along the midrib. The leaves near the growing point often have curved tops. The laminae are harsh and brittle and sometimes rather corrugated. On the same tree may be seen affected branches and others that are seemingly healthy, the affected branches then being more or less vertical and having a witch's broom appearance. The diseased trees come into flower late, and the flowers are relatively few, small, abnormal in form and frequently more greenish than normal. The disease is said to be propagated by grafting.

219. BLUMER, S. 634.23-2.8
Das Kirschbaumsterben im Baselland. **(Death of cherries in the Basle area.)**
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 203-8, bibl. 2.

The symptoms of the so-called Pfeffingen disease, which are reminiscent of "little-leaf", have been described earlier by K. Meier; see *ibidem*, 1943, 52: 424-42, *H.A.*, 14: 121; see also *Landw. Jb. Schweiz*, 1946, 60: 500-20, *H.A.*, 17: 637. While earlier investigations pointed to mineral deficiencies as the probable cause of this widespread cherry trouble in the Basle area, the author's experiments have shown that the symptoms are graft-transmissible and that the malady must be looked upon as a virus disease. Further study will show whether the Pfeffingen disease is identical with any of the cherry diseases occurring in America. The paper is a preliminary communication from the Wädenswil Research Station.

220. MONTGOMERY, H. B. S. 634.7-2.8
Problems of soft fruit for the garden.
The fruit year book, 1947, R.H.S. Lond., No. 1, pp. 77-81.

A discussion of the virus diseases of soft fruits, for the benefit of the amateur propagator.

* Not the same as green crinkle, see 217.

* Not the same as crinkle, see 213.

221. Cadman, C. H., and Hill, A. R. 634.711-2.8
Aphid vectors of European raspberry viruses.
Nature, 1947, **160**: 837-8, bibl. 3.
Under Scottish conditions the common raspberry aphids, *Amphorophora rubi* and *Aphis idaei*, are capable of acting as vectors of certain raspberry viruses. The difficulty with which transmission has been achieved accords with the slow rate of spread of mosaic diseases in the field.—University College, Dundee.

222. Wood, C. A., and Whitehead, T. 634.75-2.8
Etiology of strawberry virus diseases.
Nature, 1947, **160**: 761-2, bibl. 7.
Plants of Royal Sovereign suffering from severe crinkle contain two viruses, one of which persists in the aphis vector [see *H.A.*, 16: 661] for several days and the other for not more than one day. A preliminary analysis was made of other diseases met with in the field.—University College of North Wales, Bangor.

223. Anon. 634.8-2.8
" Court-noué " of vines.
Food and Agric., 1947, **1**: 141.
In June 1947 the International Wine Office (O.I.V.) organized a conference in Paris on " Court-noué ", a vine disease whose steady advance has caused grave concern. This disease has in the past been known as: Court-noué (France); Arricciamento (Italy, on *V. vinifera*); Roncet (Italy, on American vines); and Reisigkrankheit (Germany). The following recommendations were made by the Study Commission: (1) that in future the disease be known as " infectious degeneration "; (2) that research be directed along the following lines: transmission experiments by grafting; the search for immune or tolerant varieties; serological studies; study of phytohormones in relation to the occurrence of symptoms; the culture of infected tissues; the possible connexion between phylloxera and infectious degeneration; the apparent relationship between the number of endo-cellular filaments and the degree of infectious degeneration.

224. Nysterakis, F. 634.8-2.8
Nouvelle interprétation du mécanisme du rabougrissement (Court-noué) des vignes. **(A new interpretation of the mechanism of dwarfing (Court-noué) of the vine.)**
Rev. hort. Paris, 1947, **119**: 306-15.
The author's experiments, here illustrated by photographs, lead him to believe that there are two forms of court-noué, of which one is due to a parasite; these can only be distinguished by vegetative propagation of dwarfed plants and by growing healthy plants in soil where affected plants have grown. The symptoms of court-noué can be induced in healthy plants by upsetting the natural balance of growth substances with β-indoleacetic acid. In the field this balance may be upset by a parasite, in which case the court-noué disease might appear to be transmissible; or by frost damage, excessive manuring, etc., when the symptoms would not persist.—University of Toulouse.

225. Bastisse, E. M. 634.8-2.8
Contribution à l'étude d'une thérapeutique préventive possible du court-noué des vignes. **(The possibility of preventing court-noué disease of the vine by chemical treatment.)**
Rev. hort. Paris, 1947, **119**: 392-9, bibl. 5.
It is agreed that factors predisposing the vine to court-noué include faulty cultivation, unbalanced manuring and pests. The symptoms may be induced by (1) cold weather, (2) fungal, bacterial or virus disease or (3) physiological disease due to toxic substances originating within or outside the plant. The author is attempting to control the disease chemically and he has tested the effect on growth of 22 metals, some at different valencies. A piece of bark is raised from the stem in spring before the sap begins to flow. A hole is drilled into the wood and in it is placed a colloidal complex of the metallic oxide with silica. Some elements affected the growth of diseased vines considerably. This is discussed in some detail.—Centre National de Recherches Agronomiques, Versailles.

Bacteria.

226. Jones, S. G. 634.715-2.314
An anatomical study of crown-gall tumors on the Himalaya Giant blackberry (*Rubus procerus*).
Phytopathology, 1947, **37**: 613-24, bibl. 10.
The anatomy of the sub-aerial galls caused by *Bacterium tumefaciens* on the Himalaya Giant blackberry is described and illustrated. The galls originate from the outer layers of the pericycle.—University of Glasgow, Scotland.

227. MacFarlane, C. S. 634.8-2.314
The activity of the " Vlamsiekte " organism in soils.
Fmg S. Afr., 1947, **22**: 820-2.
A preliminary review showing that the soil organism *Erwinia vitivora* is a potential danger to grape vines. When a vine becomes infected in its aerial shoot the infection may quickly spread through the whole vineyard as a result of cultivation and pruning operations. The use of pomace as manure adds to the risk of infection.—W. Prov. Fruit Res. Stat., S. Africa.

Fungi.

228. Frezzi, M. J. 632.4: 634/635(82)
Contribucion al estudio del " damping-off " o enfermedad de los almacigos en la Republica Argentina. **(Damping-off or nursery disease in Argentina.)**
Publ. Inst. Sanid. veg. B. Aires **30**, Ser. A, 1947, 40 pp., bibl. 80.
Damping-off in Argentine nurseries is caused by fungi of the genera *Fusarium*, *Phytophthora*, *Pythium*, *Rhizoctonia* and *Sclerotium*. In natural infections and in inoculation experiments it was found that affected plants fell over with the exception of citrus plants which remained erect. In artificial inoculations *Pythium ultimum* and another species not identified proved to be the most virulent. Good control has been obtained by treating the soil with 2% formalin and the application of zinc oxide, at the rate of 20 g. per square foot, when the seedlings begin to appear above the surface of the soil.

229. Favard, P. 632.4: 634.1/7
Sur trois champignons parasites du verger. **(Three parasitic fungi in the orchard.)**
Prog. agric. vitic., 1947, **128**: 341-4.
Descriptions of bark canker (*Dermatea corticola* Arnaud), stem rot (*Schizophyllum commune* Fr.) and internal rot of core fruits (*Coryneum foliicolum* Fuckel), three fungous diseases of fruit trees.

230. Brien, R. M. 632.4: 634.1
A new source of infection for fruit.
Orchard. N.Z., 1946, **19**: 11: 3.
Glomerella cingulata, the cause of bitter rot of apple, pear and quince, has been found attacking about 70% of the fruit on a 5-year-old hedge of *Eugenia smithii*, which may therefore serve as a source of infection for other fruits and should not be used as a shelter-belt around pome fruit orchards.

231. Directie van de Landbouw. 632.42: 634.11 +634.13
De schurftziekte van appel en peer. **(Scab of apples and pears.)**
Meded. PlZiekt. Dienst, Wageningen, **50**, 1947, 7th edition, 23 pp., f. 0.35.
An illustrated account of apple scab and pear scab and their control with a list of varieties sensitive to Bordeaux mixtures

and others sensitive to lime-sulphur. Combined sprays for scab and insect pests are discussed.

232. DARPOUX, [H.]. 632.42: 634.11 + 634.13
Les tavelures du poirier at du pommier. **(Pear scab and apple scab.)**
Jardins de France, 1947, **1**: 215-26, 241-50.
An illustrated account of the life histories of the fungi causing these diseases. Having begun to test some of the new American fungicides, the author recommends the continued use of the standard remedies, which he describes. An outline is given of the observation of ascospore formation for the correct timing of protective sprays.—Station Centrale de Pathologie Végétale, Versailles.

233. TAYLOR, G. G. 634.11-2.42
Field trials with bordeaux mixture for control of ripe-spot (*Neofabraea malicorticis*).
N.Z. J. Sci. Tech., 1946, **28**, Sec. A, pp. 139-44, bibl. 2.
The recommended treatment of bordeaux mixture 2-6-100 in mid-January and 1-4-100 in mid-February [in New Zealand] gives commercial control of ripe-spot in Sturmer apples (*H.A.*, 14: 580). Foliage damage is very slight and fruit damage is of little or no commercial significance. Spray residues are sometimes heavy but not commercially objectionable. Fruit maturity at time of picking appears to have considerable influence on development of ripe-spot in cool store.

234. YIN, K. Y. 634.11-2.4
Development and control of the stem canker of *Macrophoma* ring spot of apples. [Chinese.]
J. Agric. Ass. China, Suppl. No. 50. Abstracts of papers, 25th Annual Meeting, 1945, pp. 27-8.
Ring spot of apples due to the fungus *Macrophoma kuwatsukaii* Hara has caused serious damages in Chengtu. In 1942 destruction of apples of the Grimes Golden variety in storage was 78·6% and on trees about 20%. The fungus also attacks stems and leaves. On leaves it produces brown irregular lesions sometimes with concentric rings, but it produces no spores and is therefore not economically important. Stem cankers, however, bear fructifications with numerous spores. There the mycelium may live over 4 years and may penetrate into cambium or even wood. It cannot be eradicated by debarking. The fungus enters the stem through the lenticels and symptoms appear after about 2 weeks. The lenticels break open in mid-April and new cankers can be seen in May. Production of spores is conditioned by temperature and humidity. In nature spore formation becomes active when temperature exceeds 20° C. and relative humidity 75%. In the laboratory maximum production is at 28° C. and 98·2% humidity. Dispersal of spores depends primarily upon rain. The distance of dispersal does not exceed 10 metres, but the time of dispersal is protracted, extending even into the winter. Several methods of control using, e.g., mixtures of formaldehyde-lime, zinc chloride-glycerol-alcohol, and mercuric chloride have been tried with various degrees of success. Further experiments are in progress.

235. DIRECTIE VAN DE LANDBOUW. 634.11: 634.13: 632.4
De kankerziekte van appel en peer. **(Apple and pear canker.)**
Meded. PlZiekt. Dienst, Wageningen, **109**, 1947, 8 pp., f. 0.15.
A popular illustrated account of apple and pear canker and its control together with a list of varieties that are very susceptible and others that are but slightly so.

236. ANDERSON, H. W. 634.13-2.6/7
Pear diseases and their control.
Trans. Ill. St. hort. Soc. for 1946, 1947, pp. 285-91.
Mainly a discussion of defoliation of pear trees caused by pear leaf-blight, *Fabraea maculata*. Other pear diseases mentioned are fire-blight, pear scab, sooty blotch and *Septoria* leaf-spot. Excepting fire-blight, all can be controlled by sprays.—Illinois.

237. ANDERSON, H. W. 634.25-2.4
Summer fungicides and peach leaf curl.
Ill. Hort., 1947, **36**: 3: 2-3.
A good fungicidal summer spray will control leaf curl the following spring. Dormant spraying is nevertheless advisable to reduce fresh infection later.

238. HUTTON, K. E. 634.2-2.4
Brown rot of stone fruits.
Agric. Gaz. N.S.W., 1947, **58**: 487-91.
Brown rot (*Sclerotinia fructicola*), the most serious fungus disease of stone fruits in New South Wales, can destroy an entire crop. The symptoms and cycle of the disease are described. Control measures involve orchard sanitation and spraying. The bud-swell spray—bordeaux mixture (15-15-100) plus ½ gall. white oil, or lime-sulphur (1 : 20) —is particularly important. Further protective sprays should be applied (1) when most of the flowers have pollen, (2) at shuck-fall, and at 4 week intervals if the weather is showery. The following warnings are given for coastal areas: (*a*) Early variety of peaches. Do not use bordeaux mixture or other copper sprays, or lime-sulphur; other sulphur sprays are safe to use. (*b*) Early varieties of apricot. Sulphur sprays in any form should not be applied; bordeaux mixture (1½-1-80 + ½ gall. white oil) may be used, or copper oxychloride (½ to 80 gall. + ½ gall. white oil).

239. QUANTZ, L. 634.21-2.411
Über Infektionsversuche mit einer *Phytophthora* von Aprikosenfruchtfäule. **(Inoculation experiments with a *Phytophthora* species causing apricot rot.)**
Festschr. O. Appel, biol. Zentralanst Land-u. Forstwirtsch. Berlin-Dahlem, 1947, pp. 63-4, bibl. 4.
The symptoms of a rot of apricot fruits are described, from which a *Phytophthora* species has been isolated that is taxonomically near to *P. cactorum*. This is the first record of a *Phytophthora* rot of apricots. Inoculations were made with the isolate and infections caused in tomato, apple and peach. In tomatoes only ripe fruits succumbed to the inoculation and then only after previous wounding. When the skin had been pierced prior to the inoculation, the 16 apple varieties tested proved susceptible to the fungus, though varietal differences were observed in the rate of spread of the rot. No wounding was required in the case of peach.—Biol. Zentralanst. Celle.

240. HUDSON, J. P. 634.711-2.4
Spring treatment of newly-planted raspberry canes.
N.Z. J. Agric., 1947, **75**: 255.
This short article deals chiefly with controlling raspberry cane spot. In addition to the usual spraying the following information is given: Cutting newly-planted canes down to ground level when the suckers are 6 in. high (but not before) will reduce the risk of the new shoots being infected with cane spot from the old canes. It is also worth while, toward the end of the growing season, to cut out heavily-infected canes to ground level, and burn them, because they will not, in any case, bear a useful crop and will serve only as a centre of infection for other canes.

241. ANDERSON, H. W. 634.75-2.4
Strawberry fruit rots and their control.
Trans. Ill. St. hort. Soc. for 1946, 1947, pp. 239-43.
A short discussion on the fungi associated with fruit rots, particularly *Botrytis cinerea*. Suggestions are made for improved sanitation in the field and the packing shed as a means of control.—Illinois.

242. Demaree, J. B., and Wilcox, M. S. 634.73-2.4
Fungi pathogenic to blueberries in the eastern United States.
Phytopathology, 1947, **37**: 487-506, bibl. 22.
A summary is given of the literature on the more common and widespread forms of blueberry pathogens. Three new pathogenic fungi are described, *Dothichiza caroliniana*, *Phyllostictina vaccinii*, and *Gloeocercospora inconspicua*.

243. Smith, W. P. C., and Stewart, R. 634.38-2.4
Leaf spot disease of black mulberry.
J. Agric. W. Aust., 1947, **24**: 69-74.
The following control measures are recommended for *Septogloeum mori* disease on black mulberry. (1) At leaf fall in autumn rake up the fallen leaves and burn or bury them deep in the ground. (2) When the buds start to swell in spring spray the trees thoroughly with either lime-sulphur 1 : 15 or bordeaux mixture 6 : 4 : 40. (3) About a fortnight later apply a second spray, either lime-sulphur 1 : 50 or bordeaux mixture 3 : 4 : 40. (4) If then dry weather prevails further spraying may be unnecessary, but if there is wet weather apply a third spray, after the fruit is set, of lime-sulphur 1 : 100 or bordeaux mixture 2 : 4 : 40. With each spray incorporate calcium caseinate at ½-1 lb. per 40 gal. as a spreader.

244. Staehelin, M., and Leyvraz, H. 634.8-2.481
Lutte contre la pourriture grise du raisin (*Botrytis cinerea*). **(The control of grey mould of grapes.)**
Rev. romande Agric. Vitic., 1946, **2**: 59-61.
Three applications of oxyquinolene (as Tumex) and of organic sulphur compounds (Organol, Pomarsol) noticeably reduced grey mould infection. They cannot be recommended, however, until further trials have been made to test their economic value.

245. Staehelin, M. 634.8-2.4
Résultats acquis dans la lutte contre le coître ou " maladie de la grêle ". **(Control trials against *Coniothyrium diplodiella* on vines.)**
Rev. romande Agric. Vitic., 1946, **2**: 51-3.
It was found that this disease could be checked by oxyquinolene preparations, and experiments are described in which such preparations, under the name Tumex, gave promising results. Tumex applied as a 0·5% solution with a wetter at 2% gave excellent control. Tumex powder gave irregular results; with 3% of the active substance it was not sufficiently effective but 5% gave much better results.

246. Gouvernement général de l'Algérie. 634.8-2.411
Viticulteurs. Le mildiou et l'Oïdium menacent vos vignobles. **(Downy mildew and oidium of vines.)**
Doc. Rens. agric. Algér. Bull. **133**, 1946, pp. 2.
For mildew the advice is to open up the plants and spray with bordeaux mixture, for oidium to use sulphur or polysulphides. For combined treatment polysulphide or wettable sulphur may be added to the bordeaux mixture.

247. Gallay, R., and Staehelin, M. 634.8-2.4+2.952
Bouillie bordelaise, oxydules de cuivre et oxychlorures de cuivre dans la lutte contre le mildiou de la vigne. **(Bordeaux mixture, cuprous oxides and copper oxychlorides for controlling vine mildew.)**
Publ. Stat. féd. Ess. vitic. arbor., Chim. agric., Montagibert, Lausanne **353**, 1947, pp. 8.
Data of experiments carried out in 1946 against vine mildew [*Plasmopara viticola*] are presented and from them the authors recommend—Preblossom: cuprous oxide at 0·4% or copper oxychloride at a concentration recommended by the manufacturers, or bordeaux mixture 1·5% to 2%. Postblossom: preferably bordeaux mixture. A number of authorized proprietary cuprous oxide and copper oxychloride preparations are mentioned.

248. Wang, C. M. 635.1/7: 632.4
Life history and physiological specialization of *Peronospora parasitica* (Pers.) de Bary. [Chinese.]
J. Agric. Ass. China, Suppl. No. 50, Abstracts of papers, 25th Annual Meeting, 1945, pp. 25-6.
In Chengtu, Szechuan, *Peronospora parasitica* (Pers.) de Bary has been found to be parasitic on hosts all the year round and it may get into the seeds. Both the seedlings and leaves of *Brassica oleracea* are susceptible, and give rise to large numbers of sporangia after rain. The disease also attacks *Brassica juncea* and *Raphanus sativus*.

249. Hadorn, C. 634.8-2.4
Lässt sich eine Rotbrenner-Epidemie wirksam bekämpfen ? **(The effective control of a rougeot epidemic. Four years' observations and results.)**
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 133-52, bibl. 5.
During the 1943-45 seasons no effective control of the " rougeot " of vine (*Pseudopeziza tracheiphila*) was achieved with either bordeaux mixture or with Kupfer Sandoz. Eventually, however, in 1946 small-scale experiments were successful, when the suspended sulphur preparation Thiovit was added to Kupfer-Sandoz. The 1946 results showed that in ordinary years, when the infestation is not excessive, control can be effective without the addition of Thiovit, provided that the fungicides are applied thoroughly, early and at short intervals. In certain localities, where cuprous oxide affects the vine, the addition of Thiovit was found to counteract this undesirable influence. This is important, since the conditions favouring cuprous oxide injury also favour the development of the fungus. Thiovit may even have a third protective function, viz. the control of *Oidium*. Full recommendations are made in this paper for the control of the disease.

Mites and insects.

250. Anon. 632.73
Thrips.
Vlugschr. PlZiekt.Dienst, Wageningen, **44**, 1947, pp. 7.
A general, illustrated leaflet on thrips with particular reference to their occurrence on flax, peas, and plants under glass (e.g. rose, ferns, chrysanthemum; peach, vine, cucumber, etc.). Control can be obtained by the use of nicotine, DDT, cyanides, or naphthalene.

251. Michelbacher, A. E., and Swanson, C. 634.8-2.73
Control of thrips on grapes with DDT.
Circ. Calif. agric. Exp. Stat. **365**, 1946, p. 71.
Thrips may cause a severe dropping of blossoms and very young fruits, most of the damage occurring between 15 May and 20 June. DDT dusts were effective in controlling the thrips, but the exact concentration, dosage, and frequency of application for satisfactory control remain to be determined.

252. Austin, M. D., and Massee, A. M. 632.651.3: 634.1/2
The fruit tree red spider and its control.
Fruitgrower, 1947, **104**: 624.
Red spider and its control.
Grower, 1947, **28**: 692-3.
Experiments in Essex show that 95% of the winter eggs of the fruit tree red spider are destroyed by a 3% spray of petroleum oil emulsion, applied in the latter half of February, or in March. The addition of D.N.C. [dinitrocresol] did not increase the kill. The winter treatment should be followed by lime-sulphur or derris, applied about the first week of June and again two or three weeks later, to control the survivors.

253. Bovey, P. 632.654.2
Essai de lutte contre l'araignée rouge des arbres fruitiers *Paratetranychus pilosus* (C. et F.)= *Metatetranychus ulmi* (Koch). **(Control trials against the fruit tree red spider.)**
Rev. romande Agric. Vitic., 1946, **2**: 6-7.
The trials recorded lead to the following conclusions. (1) An application of white oil 3% in March was inadequate to prevent severe reinfestation during the summer. (2) Lime-sulphur 1% +a wetter 0·1%, and lime-sulphur + Derril (a rotenone preparation) 0·3%, gave satisfactory, almost similar results, but the former is to be preferred as being less expensive. (3) The best results were obtained with a rotenone-containing oil (Derriphytane) which, applied once only at the beginning of the invasion of the foliage, gave almost total protection.

254. Astrego, J. J. 634.13-2.654.2
Bestrijdingsproef perepokziekte. **(Control trials against pear pit disease.)**
Meded. Direct. Tuinb., 1947, **10**: 182-3.
In trials against pear pit caused by *Eriophyes pyri*, the pear leaf blister mite, spraying with lime-sulphur 5% or 11% or carbolineum 5% in the middle of March, or with D.N.C. 1% ten days later (just as the buds began to break) gave good control, but the stronger lime-sulphur should be avoided as it may cause damage.

255. Anon. 634.13-2.654.2
De pokziekte van de peer. **(Pear leaf blister.)**
Vlugschr. PlZiekt. Dienst, Wageningen, **38**, 1947, 3 pp.
The life history of the pear leaf blister mite is outlined and the damage it causes to pear leaves and flowers described and illustrated. Spraying with carbolineum (7½%) just as the buds begin to swell, or a little later with lime-sulphur (10%) is recommended for control.

256. Frazier, N. W., and Smith, L. M. 634.8-2.654.2
The Willamette mite on grapes [in California].
Hilgardia, 1946, **17**: 191-6, bibl. 6.
Banding the bases of the spurs with a sticky material is suggested as a possible control of *Tetranychus willamettei*.—San Joaquin Valley, Calif.

257. Cutright, C. R., and Sutton, R. 634.11-2.654.2
Effectiveness of acaricides in DDT-sprayed apple orchards.
J. econ. Ent., 1947, **40**: 557-61.
The present status of mite control in DDT-sprayed orchards may be summarized as follows: 1. Applications of dormant spray oil are absolutely necessary. 2. Summer spray oils are very effective against mites but are objectionable because of foliage and fruit injuries and difficulties with fungicide combinations. 3. The dinitro compounds are at present the most satisfactory acaricides for summer use. 4. The present available acaricides are not entirely satisfactory and new chemical materials and methods of effective applications need to be developed. 5. A summer acaricide having ovicidal and residual properties is especially needed. [Authors' summary.]—Ohio.

258. van den Bruel, W. E. 634.75-2.654.2
Sur la présence en Belgique d'un redoutable ravageur du fraisier *Tarsonemus pallidus* Banks (syn. *T. fragariae* Z.). **(The strawberry tarsonemid mite in Belgium.)**
Parasitica, 1946, **2**: 129-36.
The strawberry tarsonemid mite is recorded for Belgium. Its life history, the damage it causes, and measures for its control are discussed, with particular reference to the use of methyl bromide vapour.

259. Heeley, W. 632.654.2: 634.11
The 1947 trials with growth substances plus white oil.
Fruitgrower, 1947, **105**: 13-14.
A 1% petroleum spray, applied at the time of maximum hatch of winter eggs, gives economic control of red spider on apples for some weeks. On some varieties a degree of leaf fall may follow treatment; this may be prevented by adding α-naphthaleneacetic acid to the spray. If the growth substance results in the retention of too many small fruits, these must be thinned.—Shell Chemicals.

260. Bovey, P. 632.752: 634.1/8
Une grave menace pour notre arboriculture: Le pou de San-José (*Quadraspidiotus perniciosus* Comstock). **(A serious pest of vines: the San-José scale.)**
Rev. romande Agric. Vitic., 1946, **2**: 41-5.
The San José scale is described and illustrated and accounts are given of its origin and geographical distribution, its host plants and the damage caused, its life cycle and multiplication, with a note on methods of control, particularly phytosanitary measures.

261. Gallay, R., and Bovey, P. 632.752: 634.1/8
Le pou de San-José dans la région lyonnaise. **(The San José scale in the Lyons region.)**
Renforcement de nos mesures préventives de défense contre le pou de San-José. **(Reinforcing preventive measures against the San José scale.)**
Rev. romande Agric. Vitic., 1946, **2**: 45-7, 47-8.
The first of these two articles describes and shows in a map the distribution of San José scale around Lyons, an area which is so near Switzerland as to be a source of danger to the Swiss vineyards. The second article gives an account of the frontier measures to exclude the pest, and the precautions that are being taken within the country to guard against its introduction.

262. Bachmann, F. 632.752: 634.1/8
Beobachtungen und Erfahrungen bezüglich der San José-Schildlaus im Südtirol. **(Observations on San José scale control in the South Tyrol.)**
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 194-7.
The small-scale trials of the Wädenswil staff in the South Tyrol, reported upon *ibidem*, 1946, 55: 511-26 (*H.A.*, 17: 694), continued and comparative tests with a motor sprayer were begun. Growers in the area apply a 30-40% lime-sulphur spray against San José scale at bud burst, using large amounts of liquid per tree. Since sulphur is cheap in Italy, this is supposed to be the most economic treatment, but the author holds that a mineral oil winter wash has advantages from the financial and labour point of view. The following trees were found to be infested at distances of from 5 to 25 m. from the nearest fruit tree and to constitute a source of reinfestation: *Prunus spinosa*, *Cornus sanguinea*, *Salix caprea*, *Morus* sp., *Betula* sp.

263. Stafford, E. M., and Hinkley, H. S. 634.63-2.752
DDT and related compounds for control of black scale on olives.
Circ. Calif. agric. Exp. Stat. **365**, 1946, pp. 91-3.
DDT both as a wettable powder and dissolved in spray oil showed promise for the control of black scale [*Saissetia oleae*] on olives, but analyses show that there is sufficient penetration of DDT into olives to make the practice of spraying olive fruits with any form of DDT an extremely hazardous one.

264. Lange, E.-G. 632.752
Erstauftreten der San-José-Schildlaus in der Pfalz und die zu ihrer Abwehr eingeleiteten Massnahmen. **(First records of the San José scale in the Palatinate and the control measures initiated.)**
Festschr. O. Appel, biol. Zentralanst. Land-u. Forstwirtsch., Berlin-Dahlem, 1947, pp. 22-3.

The infestation, recorded in the Palatinate for the first time in 1946, was serious in some areas.

265. MIDDLEKAUFF, W. W., MICHELBACHER, A. E., AND SWANSON, C. 632.752
Increase of frosted scale *[Lecanium pruinosum]* following use of DDT and other sprays.
J. econ. Ent., 1947, **40**: 442-4, bibl. 11.
On walnuts sprayed for the control of codling moth for two seasons.—University of California.

266. ANON. 632.753
Bladluizen. **(Leaf aphids.)**
Vlugschr. PlZiekt. Dienst, Wageningen **1**, 1947, pp. 5.
A general account of the plant aphids, their habits, natural enemies and measures of control. For winter treatment fruit tree carbolineum or dinitrocresol is advised. The merits of nicotine, derris and pyrethrum preparations for summer applications are discussed. DDT and 666 are of limited value against aphids. For use in small gardens a soap-spirit solution is recommended, consisting of 200 g. soft soap and 100 c.c. methylated spirit in 10 litres of water. For sensitive plants (e.g. choice roses) the soap and spirit should be used at half those amounts, and for the bean black fly the spirit can be increased to 150 c.c.

267. GAYFORD, G. W. 632.654.2 + 632.753
Winter pest control in the orchard.
J. Dep. Agric. Vict., 1947, **45**: 265-7.
Notes on the control of San José scale, woolly aphis, pear blister mite, bryobia mite, green peach aphis, black cherry aphis and black peach aphis.

268. BODENHEIMER, F. S. 632.753: 634.11
Studies on the physical ecology of the woolly apple aphis *Eriosoma lanigerum*) and its parasite *Aphelinus mali* in Palestine.
Bull. Agric. Res. Stat. Rehovot **43**, 1947, pp. 20, bibl. 8.
Under Palestine conditions *Aphelinus* is regarded only as a secondary factor which may be able, after its establishment, in normal years, to reduce slightly the late spring population of the aphis, and in years of heavy outbreaks to reduce the residual aphid population from midsummer to winter. Even during the season of heaviest infestation a small number of woolly aphis in almost every colony avoids being parasitized by *Aphelinus*. The recommendations for the control of *Eriosoma* in outbreak years, or in heavily infested areas are as follows: (1) Winter spraying with 0·2% nicotine sulphate (40%) added to the regular winter wash spray. (2) Two summer sprays (in June and July) and a third in September of 0·15% nicotine sulphate added to a 1% emulsion of summer oil sprays. The two summer sprays may replace the corresponding lead arsenate sprays against codling moth. Experiments with DDT dusts and sprays gave unsatisfactory results.

269. MILLER, L. W. 632.96
The biological control of insect pests in Tasmania.
Tasm. J. Agric., 1947, **18**: 117-9, bibl. 3.
The biological control of seven insect pests has been attempted in Tasmania during the last 25 years. *Aphelinus mali*, parasite of the apple woolly aphid, is now well established in every apple growing area of the State, and in many areas the use of insecticides for the control of the pest is unnecessary. A parasite of the cabbage butterfly is well established, but its value cannot yet be assessed. Tomato white fly has been adequately controlled.

270. PUSSARD, R. 632.753: 632.96
Sensibilité d'*Aphelinus mali* Hald. aux traitements insecticides. **(The sensitiveness of *Aphelinus mali* to insecticides.)**
C.R. Acad. Agric. Fr., 1947, **33**: 287-91.
The conclusions drawn from the experiments described are: (1) Anthracene oil emulsified in bordeaux mixture at about 5% produces total mortality in the hibernating *Aphelinus*. (2) Emulsions of vegetable oils and of white mineral oil are very toxic to the hibernating stages. (3) Soap and nicotine solutions become more toxic as the nicotine content is increased. (4) Sulphide of polychlorocyclane and hexachlorocyclohexane, recommended for the control of the woolly aphid, are equally lethal for its hibernating parasite. (5) Dichlordiphenyltrichlorethane, to which the adults of *Aphelinus* are particularly sensitive, has no definite action on the stages of the parasite when it is protected by the "wool" of the woolly aphid.

271. KLINKENBERG, C. H. 634.75-2.753
Het onderzoek van bladluizen op aardbeien. **(Strawberry aphids.)**
Meded. Direct. Tuinb., 1947, **10**: 214-5.
Aphids were collected by various observers in Holland and sent to the Laboratory for Mycology and Potato Research at Wageningen where they were identified and put into 3 groups, viz. A. Those known to be vectors of virus diseases. *Capitophorus fragariae* was the only one in this group. B. Those which infest strawberries but are not known to carry viruses. This group contains 6 species. C. Those which normally infest other hosts and only occasionally appear on strawberries. *Aphis forbesi*, although Holland is outside its range, is briefly described. It occurs in N. America and has been found in Europe. It forms small, compact colonies on the plants, especially on the young leaves, petioles and stolons, and causes direct injury, the leaves drying up but without distortion.

272. FRAZIER, N. W., AND STAFFORD, E. M. 634.8-2.754
Control of the leafhopper *Erythroneura elegantula* on grape with DDT and other insecticides.
J. econ. Ent., 1947, **40**: 487-95, bibl. 2.
The grape leafhoppers were effectively controlled by DDT used in spray, thermal aerosol fog, vapour-spray and dust. The factors most important for control were apparently the coverage, the amount of DDT per acre, and the timing of the application. Modifying factors were the efficiency of equipment used, the volume of dust per acre, and the amount of foliage present. No apparent differences in control resulted from the use of dusts containing DDT prepared in micronized, non-micronized, or fused forms with average particle sizes of 3·5, 10, and 10 to 12 microns. At concentrations and dosages used in these experiments, neither DDD [1,dichloro-2,2-bis (p-chlorophenyl) ethane] nor 666 was so effective as DDT against the grape leafhopper. In the field treatments, DDT remained effective on grape leaves for a considerably longer period when applied in oil than when used in dust mixture. As a vapour-spray, 0·65 lb. per acre of DDT showed the same level of toxicity 136 days after application as did 1·0 lb. per acre 66 days after application as a dust. No toxicity to grape leafhoppers from DDT residue was evident in any plot 152 days after treatment. [Authors' summary.]—University of California.

273. STAFFORD, E. M., AND FRAZIER, N. W. 634.8-2.754
DDT for control of the grape leafhopper.
Circ. Calif. agric. Exp. Stat. **365**, 1946, pp. 66-70.
DDT applied in early May as a dust with sulphur, or as a vapo-spray or a water suspension spray, gave control of grape leafhopper adults and nymphs. Dusts of 4 or 5% DDT at 20 lb. per acre were more effective than a 3% dust applied at the same rate.

274. FRAZIER, N. W. 634.25-2.754
Tests of sabadilla for controlling the green stinkbug on peaches.
Circ. Calif. agric. Exp. Stat. **365**, 1946, p. 93.
The application of a commercial 10% sabadilla dust in a peach orchard gave excellent results against the green stinkbug, *Acrosternum hilaris* Say.

275. SAVARY, A. 632.76: 634.1/8
Scolytes et bostriches. **(Bark and shot borer beetles.)**
Rev. romande Agric. Vitic., 1946, **2**: 93-5.
The bark and shot borer beetles of fruit trees, and the damage they cause, are briefly described, with notes on the fruit bark beetle (*Scolytus rugulosus*), large fruit tree bark beetle (*S. mali*), shot hole borer (*Anisandrus dispar*), and the flat-celled shot borer (*Xyleborus saxeseni*). Since these insects live within the tissues of the trees they are difficult to control, but certain general hygienic preventive measures can be adopted. If trees are seriously attacked they should be dug up and used as fuel; they should not be kept until spring, for then the insects escape and infest other trees. If attack is slight, carbon bisulphide can be introduced into the holes which are then covered with pruning wax. Recent experiments have shown that the adults are very sensitive to DDT and it seems possible that control can be obtained by applying 2% DDT to trunks and branches.

276. ANON. 632.76: 634.1/2
An auger beetle (*Bostrychopsis jesuita*).
Agric. Gaz. N.S.W., 1947, **58**: 427-8.
This beetle attacks native and introduced trees, and fruit trees damaged include apple, apricot, fig, lemon and orange. No means of control it is at present known.

277. ANON. 632.76: 634.22+634.55
Mortalités comparées de différentes Amygdalées. **(Comparative mortality of different *Amygdaleae* [in Morocco].)**
(*Mim. Publ.*) *Serv. Hort., Rabat*, 1947, pp. 3, bibl. 1.
Losses of rootstocks at the Regional Horticultural Station at Ain Taoujdat during 1945-47 were ascribed chiefly to *Capnodis tenebrionis*. The following losses were recorded ten years after planting—plum 62%, apricot 23%, peach 19%, almond 6%. [It is not stated whether these stocks had been grafted.]

278. ASTREGO, J. J. 634.11-2.76
Bestrijdingsproeven tegen den appelbloesem-snuitkever in 1946. **(Control trials against the apple blossom weevil in 1946.)**
Meded. Direct. Tuinb., 1947, **10**: 183-6.
The author concludes from his results that the best control of the apple blossom weevil is obtained with DDT applied just as the weevils begin to be active in spring.

279. KUENEN, D. J. 634.13-2.76
De perebloesemkever (*Anthonomus cinctus* Redt.) Verslag van de werkzaamheden in 1946. **(The pear blossom weevil. Report of work in 1946.)** [English summary ½ p.]
Meded. Direct. Tuinb., 1947, **10**: 275-88.
The apple bud weevil is known on the continent as the pear blossom weevil for it occurs there almost exclusively on pears, damaging leaf buds and fruit buds. It is found all over Holland, but unevenly distributed. The damage caused was found to be much more extensive than was previously thought, for it had been attributed to frost, fungus infection, spray damage, etc. Its life history is outlined and control measures are discussed. Spraying with DDT about the middle of September gave good control in 1945 and 1946, reducing the number of damaged buds from 50-90% to 2-6%.

280. SCHNEIDER, F. 634.23-2.76
Die Bedeutung des Kirschenstechers (*Anthonomus rectirostris* L.) für den schweizerischen Kirschenanbau. **(The significance of the cherry weevil (*Anthonomus rectirostris* L.) for cherry growing in Switzerland.)**
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 370-4, 388-90, 402-4.
The cherry weevil causes damage chiefly by gnawing immature fruits and by boring into ripe fruits to deposit its eggs there. European bird cherry (*Prunus padus*) and sweet cherry wildlings are much more affected than large-fruited, cultivated forms, of which the early varieties escape injury almost completely. Losses were fairly considerable in the canton of Graubünden, where the mountain villages frequently harbour half-wild, small-fruited cherries, and where forests and hedges are permanent sources of infestation. Where the weevil requires control, destroy all wild cherries and plant large-fruited early varieties. As a transition measure two 1% post-blossom Gesarol applications are recommended. The author discusses biology, symptoms, distribution, obstacles to mass infestations and control.

281. BOVEY, P. 634.13-2.76
Le bupreste du poirer (*Agrilus sinuatus* Oliv.), ravageur peu connu de nos vergers. **(The sinuate pear borer, a little known orchard pest.)**
Rev. romande Agric. Vitic., 1946, **2**: 99-101.
The sinuate pear borer beetle and the damage it causes are described and illustrated. It attacks various woody rosaceous plants, but the pear is its most important host plant. It occurs throughout central and southern Europe, and was introduced into the United States, where it was found in 1894. Its life history and control measures (using lead arsenate) are described, based on the work of Glasgow in America (see *H.A.*, 5: 61). It is suggested that the newer insecticides such as DDT and 666 may be of use in controlling this pest.

282. SNAPP, O. I. 632.768: 634.25
Benzene hexachloride for control of plum curculio [*Conotrachelus nenuphar*] on peaches.
J. econ. Ent., 1947, **40**: 382-5.
The results of cage, single-tree, and orchard tests indicate that benzene hexachloride is a promising insecticide for plum curculio on peach. They indicate that about 1 lb. of benzene hexachloride containing at least 10% of the gamma isomer is needed per 100 gallons of spray for effective control, that the material is more effective used as a spray than as a dust, that concentrations containing 6 lb. or less of a 31·6% water-dispersible powder per 100 gallons of spray will not injure peach fruit, foliage, buds, budwood, or other parts of the tree, and that the material may affect fruit flavour adversely if used in sufficient concentration too close to the harvest period. In preliminary experiments the material also showed promise for treating peach drops to prevent the emergence and subsequent development of plum curculio larvae. [From author's summary.]

283. HALLEMANS, A. 634.75-2.76
De aardbeibloemknopafsteker (*Anthonomus rubi* Herbst.). **(The strawberry blossom weevil.)**
Cultuur Hand., 1947, **13**: 5: 18.
A brief note (illustrated) on the strawberry blossom weevil, its damage and control. The application of DDT, 666 or a derris preparation (preferably in powder form), as soon as the first weevils are seen in spring, is recommended. The damage caused by the strawberry rhynchites is illustrated for comparison.

284. DICKER, G. H. L. 634.75-2.76
Control of the strawberry Rhynchites (*Rhynchites germanicus* Herbst) with notes on its biology.
J. Pomol., 1947, **23**: 63-70, bibl. 8, illus.
An account is given of the life-history of this pest whose other host plants include wild and cultivated blackberry, raspberry, loganberry and phenomenal berry. From the results of laboratory and field trials in 1945 and 1946 it is shown that on strawberries a single application of 3% or 5% DDT dust, having a gypsum-china clay base, at the rate of 20-25 lb. per acre, when the first blossom trusses appear, gave excellent control. A 3% DDT dust gave protection for at least a fortnight, whilst no reinfestation

was noted up to one month after dusting with 5% DDT. A 5% benzene hexachloride ("Gammexane") dust with the same base, appeared to give only slight control.—East Malling Res. Stat., Kent.

285. DE BAKKER, G. 634.711-2.76
De frambozenkever (*Byturus tomentosus* Fabr.) en zijn bestrijding. **(The raspberry beetle and its control.)** [English summary 1½ pp.]
Meded. Direct. Tuinb., 1947, **10**: 136-64, bibl. 14.

The life history of the raspberry beetle and the damage caused by it are summarized and control trials are described. Of the substances tried Gesarol as spray or powder proved to be the most effective. Two applications, one on 31 May, the other on 11 June, yielded good results, and it is considered that the period between the two applications should not exceed 12 days.

286. PINEAU, J. 634.8-2.76
Note sur les dégats d'un ampelophage nouveau (*Philopedon plagiatum* Schaller). **(Damage caused by a new vine pest.)**
C.R. Acad. Agric. Fr., 1947, **33**: 410-12.

The coleopteron *Philopedon plagiatum*, that habitually lives on the marram grass (*Psamma arenaria*), is recorded as causing damage to vines in April, 1947. It attacks the young vine shoots during the night, and it has been found also on young pear trees. Promising results for control were obtained with dusts containing polychlorocyclane, hexachlorocyclohexane or DDT.

287. SMIT, B. 634.1/2-2.77(68.01)
The control of fruit flies [in S. Africa].
Fmg S. Afr., 1947, **22**: 728-30, 746.

Fruit flies are the worst pests of fruit in South Africa. Those attacking cultivated stone fruits are the Mediterranean fruit-fly *Ceratitis capitata*, and the Natal fruit-fly *Pterandrus rosa*. The habits of these two pests are described and advice is given on the disposal of infested fruit and the use of poison bait, applied as a spray.

288. BOVEY, P. 632.77: 634.1/2
Extension de la mouche méditerranéenne des fruits (*Ceratitis capitata* Wied.) en Suisse romande. **(The spread of the Mediterranean fruit fly into French Switzerland.)**
Rev. romande Agric. Vitic., 1946, **1**: 5-6.

The Mediterranean fruit fly appeared in Switzerland in 1935, and reappeared in 1936 and 1937. The rigorous winter of 1937/38 checked its multiplication but the more favourable climatic conditions of recent years have allowed its numbers to increase; thus in 1945 the larvae caused appreciable losses to apricots and peaches at Neuchâtel. The life history and habits of the fly are outlined, and the type of damage on peach and pear fruits is illustrated. The destruction of attacked fruit is urged.

289. COX, J. A. 634.23-2.77
Control of cherry fruit flies [*Rhagoletis spp.*].
J. econ. Ent., 1947, **40**: 588-90, bibl. 3, being *J. Pap. Pa agric. Exp. Stat.* **1362**.

In the control of *Rhagoletis cingulata* and *R. fausta*, DDT is effective, but leaves a residue difficult to remove. Cryolite and phenothiazine are also satisfactory. Lead arsenate may be used where the fruit is to be processed. Hexachlorocyclohexane cannot be used, as it taints the fruit.

290. SCHNEIDER, F. 634.23-2.77
Methoden zur Ermittlung des Kirschenfliegenbefalls. **(Methods of determining cherry fly infestations.)**
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 374-5.

To test the percentage of fruits infested, open 50 cherries from each load, put them in a jar and cover with a saturated solution of common salt. After 5-10 minutes the larvae will float and can be counted.

291. MILLER, L. W. 632.78
Codling moth control experiments.
Tasm. J. Agric., 1947, **18**: 194-7.

DDT sprays on both pears and apples were more effective in controlling codling moth than either lead arsenate or combinations of lead arsenate and white oil emulsion. Gammexane used either as an emulsion or as a dispersible powder was quite ineffective against this pest.

292. JENKINS, C. F. H. 632.78
Codlin moth in Western Australia.
J. Agric. W. Aust., 1947, **24**: 42-6.

Since 1903 fourteen separate outbreaks of codling moth have occurred in Western Australia. All of them, with one exception, have undoubtedly been due to separate introductions from other states, and methods by which the insect may be introduced are discussed. The pest and the type of damage caused are illustrated for their recognition by growers, who are advised to notify any outbreaks of suspected codling moth.

293. STEPHENS, R. M. 632.78
Codling moth control. D.D.T. trials in Victoria 1946-1947.
J. Dep. Agric. Vict., 1947, **45**: 468-70.

The experiments recorded show the efficiency of 0·1% DDT against codling moth with three applications on Williams' Bon Chrétien pears and four on Jonathan apples. Until a definite summer control is obtained for bryobia mite a thorough winter oil-spray programme should be used. It is considered inadvisable to use white oil emulsion for the control of mites if DDT is included in the spray schedule.

294. CALDWELL, N. E. H. 632.78
Developments of codling moth control.
Qd agric. J., 1947, **65**: 53-6.

A short account of experiments carried out in 1946-47 to test 8 cover spray treatments using one or other of the following: lead arsenate, zinc fluoarsenate, DDT and white oil.—Stanthorpe, Queensland.

295. CHILDS, L. 632.78
DDT as a codling moth spray.
Canad. Gr, 1947, **70**: 6: 10-11, 22.

Experience at Vineland, Ontario, indicates that DDT is likely to give almost complete control of codling moth. The calyx spray is omitted, and two subsequent DDT sprays give good control; after a few seasons one annual spray may suffice. The main advantage of DDT over the standard insecticides, apart from its persistence, is that moths, newly hatched worms, and older worms are all affected.

296. CHANDLER, S. C. 632.6/7
Codling moth, mites and leaf rollers.
Trans. Ill. St. hort. Soc. for 1946, 1947, pp. 179-89.

Although DDT is the best insecticide known for use against codling moth, both mites and the red-banded leaf roller have increased with its use. A spray programme is suggested for apples in which lead arsenate is used through most of the first brood period of the codling moth. DDT is applied, with the 3rd cover, at the rate of ½ lb. per 100 gals. and again, in the second brood period, at half this rate.—Illinois.

297. WEINMAN, C. J. 632.78
Insecticide tests on codling moth in Illinois, 1946.
J. econ. Ent., 1947, **40**: 567-8.

Of four chlorinated hydrocarbons tested only DDT was effective against codling moth at the practical concentrations used. Benzene hexachloride, applied two months before harvest, affected the flavour of the fruit. Of the inorganic chemicals, zinc fluoarsenate showed no advantage over lead arsenate.

298. CHILDS, L. 632.78: 632.951
Effect of DDT on populations of codling moths.
J. econ. Ent., 1947, **40**: 452.
DDT and lead arsenate were compared in two 8-acre blocks of apple orchard. Moth catches were very greatly reduced in the area sprayed with DDT, where 95% of the fruit was undamaged and only ½% was wormy; in the area sprayed with lead arsenate 47% of the fruits was undamaged and 4½% was wormy.—Oregon Exp. Stat.

299. MICHELBACHER, A. E., SWANSON, C., AND BACON, O. G. 632.78: 634.51
Control of codling moth on Payne variety of walnut.
Circ. Calif. agric. Exp. Stat. **365,** pp. 78-84.
Sprays were applied, at a pressure of 600 lb., with sprayers having 25 foot towers, equipped for automatic spraying; about 55 gal. of material were applied per tree for each application. One spray of standard lead arsenate with a safener, applied in early May, was at least as effective as two sprays of basic lead arsenate, with the first applied in early May and the second at the end of May. DDT gave exceptionally good control of codling moth. Very satisfactory control was obtained with a spray containing ½ lb. of DDT to 100 gal. of water applied on 4 May, followed by a standard lead arsenate spray with safener on 31 May; with this combination there was no evidence of a build-up in the mite population. When used alone the total amount of DDT per 100 gal. of spray should not exceed 1 lb.

300. MICHELBACHER, A. E., SMITH, G. L., AND SWANSON, C. 634.51-2.753
Effect of codling moth sprays on the walnut aphid.
Circ. Calif. agric. Exp. Stat. **365,** 1946, pp. 87-90.
There is some evidence that trees sprayed with standard lead arsenate or basic lead arsenate are more favourable for a build-up of walnut aphid population than are unsprayed trees. DDT gave good control of walnut aphid. Trichlorochloro-phenyl-phenyl-ethane (Tanatox) appeared to be very effective in controlling the walnut aphid. The organic stomach poison HE 761 is very destructive to predators of the walnut aphid. Its long residual action against the predators gives the aphid an opportunity to build up a large and destructive population.

301. BORDEN, A. D. 632.78: 634.1/2
Control of codling moth and pear thrips on pears, and cankerworms and green fruit worm on apricots.
Circ. Calif. agric. Exp. Stat. **365,** 1946, pp. 72-6.
Sprays containing DDT wettable powder were found to be much more effective than the regular lead arsenate spray in controlling codling moth on Bartlett and Hardy pears. DDT sprays applied during the bloom cluster stage of Bartlett pears gave good control of pear thrips. A spray containing ½ lb. of actual DDT per 100 gal. of water, or a 5% DDT dust, was very effective in controlling the larvae of cankerworms and green fruit worm on apricot.

302. SMIT, B. 634.1/2-2.78
Fruit-sucking moths.
Fmg S. Afr., 1947, **22**: 758-60.
The common, indigenous fruit-sucking moths in S. Africa are *Achaea lienardi*, *Serrodes inara*, and *Sphingomorpha* sp., all three causing considerable damage to ripening fruit of many kinds. The control of these pests—a difficult matter—is discussed and a formula given for preparing a sodium fluosilicate poison bait.

303. HALLEMANS, A. 632.78: 634.1/2
Kokermotten (*Coleophora* Spec.). **(Case-bearer moths.)**
Cultuur Hand., 1947, **13**: 6: 29.
A short article on the case-bearer caterpillars found on fruit trees. Those most frequently found are *Coleophora nigricella* Sthp. (the apple and plum case-bearer), *C. hemerobiella* Scop. and *C. anatipenella* (the pistol case-bearer). Brief notes are given on their life history, damage caused and control. The control measures advocated are (1) winter spraying with DNOC to kill the overwintering caterpillars, (2) lead arsenate in spring immediately after flowering.

304. BARRAUD, —., AND CHABOUSSOU, F. 634.25-2.78
Nouveaux dégats de la tordeuse orientale du pêcher (*Laspeyresia molesta* Busck): attaques sur pommes dans le bordelais, et remarques sur la lutte contre cet insecte. **(The oriental peach moth attacking apples, and its control.)**
C.R. Acad. Agric. Fr., 1947, **33**: 199-201.
The attack of the oriental peach moth (see *H.A.*, 16: 1407, 1940) on apples is described as follows. As a general rule the larvae start by entering the fruit at any point and eating out galleries immediately below the skin. These galleries are more or less sinuous, transversal or longitudinal, often forming irregular blotches. Sometimes the attack is invisible from the exterior, the larva having entered at the calyx end or near the stalk; such fruits appear sound but the pulp is destroyed. Arsenic sprays have proved unsatisfactory, and it is suggested that the newer products such as DDT should be tried.

305. DIRECTIE VAN DE LANDBOUW. 632.787
De wintervlinder. **(The winter moth.)**
Meded. PlZiekt. Dienst, Wageningen, **3,** 1947, 6th edition, 16 pp., f. 0.25.
The life history of the winter moth (*Cheimatobia brumata* L.) is outlined and an account is given, with illustrations, of the damage caused. Its host plants are cherry, apple, pear, gooseberry, black currant, plum and hazel nut, and a number of woodland trees and bush plants. The usual control measures are given. The times recommended for applying fruit tree carbolineum depend upon the degree of bud development; they are in Holland: for cherry plum (Myrobalan) the end of January; gooseberry, the middle of February; plum and currants, end of February; apple and cherry, middle of March.

306. SHAW, H., AND STEER, W. 632.78: 634.1/2
Laboratory studies on the toxicity of hydrocarbon oils and similar substances to the eggs of some common orchard pests. I. General introduction. II. Experiments on the eggs of the winter moth (*Operophtera brumata L.*)
J. Pomol., 1947, **23**: 1-22, bibl. 23.
The materials, methods, and test organisms used in a series of investigations on the toxicity of oils to insect eggs are described. The broad chemical classification of these oils is discussed. A selection of tar and petroleum oils covering a very wide range of chemical types was tested against eggs of the winter moth (*Operophtera brumata* L.). The first broad survey showed that of several physical and chemical characteristics determined for each oil, distillation range, especially the content of oil distilling above 300° C., was most closely related to toxicity, but did not wholly explain it. Tests of distilled fractions of the neutral oils showed that for any one oil, toxicity increased with distillation range up to about 400° C., but varied widely between similar distillation ranges of different oils. The petroleum oils in general were much more toxic than the tar oils. Over the range of oils as a whole, though with some exceptions, it appeared that the proportion of aliphatic material in the oil, as judged by the percentage insoluble in dimethyl sulphate, might be a considerable factor in determining toxicity. Indirect evidence suggested that paraffinic components were probably more toxic than naphthenic. Viscosity seemed to have little connexion with toxicity, and specific gravity appeared to be connected only within small, closely related groups of oils. The phenols and bases isolated from the tar oils were not sufficiently toxic to contribute materially to the toxicity of the whole oils nor, on the other hand, were they present in sufficient quantity to reduce the toxicity by dilution. [Authors' summary.]

307. Bacon, O. G., Michelbacher, A. E., and Smith, G. L. 634.51-2.78
Control of Catalina cherry moth on walnuts.
Circ. Calif. agric. Exp. Stat. **365**, 1946, pp. 85-7.
The Catalina cherry moth attacks walnuts, but not seriously until late in the season. Harvesting a crop at the earliest possible date will greatly help to reduce infestation; delayed harvest favours severe infestation. Sprays, to be effective, should be applied after the middle of August.

308. Smith, C. F., and Veerhoff, O. 634.25-2.78
Ethylene dichloride injury to peach.
J. econ. Ent., 1947, **40**: 588, bibl. 1, being *J. Pap. N.C. agric. Exp. Stat.* **255**.
Peach trees infested with borers [*Aegeria exitiosa* ?] may be treated with a 10% to 15% emulsion of ethylene dichloride, the dose ranging from 2 oz. for a 1-year tree to 8 oz. for a 6-year-old tree. On sandy soils emulsions up to 25% may be used.

309. Bovey, P. 634.8-2.78
Résultats des essais effectués en 1945 contre les vers de la vigne (Cochylis et Eudémis). (**Trials for the control of vine moth caterpillars.**)
Rev. romande Agric. Vitic., 1946, **2**: 35-6.
Laboratory experiments showed that the vine moths were very sensitive to DDT, so field trials were carried out using a number of DDT preparations, for comparison with arsenate of lead, and nicotine. It was found that DDT of the Gesarol type applied at the beginning of flight of the moths was not sufficiently effective. The only sure way to secure efficient control is to apply the treatments immediately before the hatching of the first caterpillars. DDT emulsions were particularly effective, and a new organic preparation, Toxaline, gave results comparable with those of ordinary Gesarol.

310. Anon. 634.11: 632.79
De appelzaagwesp. (**The apple sawfly.**)
Vlugschr. PlZiekt. Dienst, Wageningen, **55**, 1947, pp. 4.
An illustrated leaflet on the apple sawfly [*Hoplocampa testudinia*] and its control. Control recommendations are the use of rotenone-containing preparations (Derris and Lonchocarpus), nicotine and preparations of 666. The last mentioned, in powder form, has given good results but it should not be used if vegetable crops or small fruits are grown under the trees for it imparts an unpleasant taste.

311. Lavaur, J. 634.13-2.793
La lutte contre l'hoplocampe des poires (*Hoplocampa brevis* Klug) dans le Sud-Ouest. (**The control of pear sawfly in the south-west.**)
C.R. Acad. Agric. Fr., 1947, **33**: 408-10.
The best results were obtained with an emulsion containing 1% polychlorocyclane sulphide. A dust containing 1% hexachlorocyclohexane was slightly less effective, while derris was definitely inferior.

312. Bovey, P. 634.22-2.793
Nouveaux essais avec DDT contre les hoplocampes des prunes (*Hoplocampa flava* et *H. minuta*). (**New trials with DDT against plum sawflies.**)
Rev. romande Agric. Vitic., 1946, **2**: 29-31.
Trials were carried out on orchard plum trees, using Gesarol and DDT emulsions. The results obtained showed that (1) Trees receiving a single application of 1% Gesarol + a wetter before blossom became severely infested with sawfly. (2) A post-blossom application of Gesarol, though giving good control, was less effective than in a trial of the previous year, a result perhaps due to the application being made after the beginning of hatching. (3) DDT emulsions gave results markedly superior to those obtained with ordinary Gesarol.

313. Chaboussou, F., and Lavaur, J. 634.22-2.7
La lutte contre l'hoplocampe [*Hoplocampa flava*] et les rhynchites du prunier. (**Control of the plum sawfly and weevils.**)
Rev. hort. Paris, 1946, **118**: 47-53, bibl. 3. [received 1947].
The following spray programme is recommended to control the pests and the associated fungi: Winter spray—anthracene oils, or 1% DNC or 3% mineral oil. Preblossom spray (white bud)—1% bordeaux mixture. Petal fall—a mixed spray of 1% bordeaux with insecticides. 5 May—1% DDT or lead arsenate. 25 May—1% DDT + 1% bordeaux.

314. Anon. 632.79: 634.13 + 634.23
De slakvormige bastaardrups. (**Pear and cherry slugworm.**)
Vlugschr. PlZiekt. Dienst, Wageningen, **30**, 1947, pp. 4.
An illustrated leaflet on the pear and cherry slugworm, viz. the larva of the pear and cherry sawfly, *Eriocampoides* (*Caliroa*) *limacina* Retz. Control measures are mentioned relative to the use of lead or calcium arsenate, nicotine, derris, and pyrethrum dust. DDT preparations do not always give satisfactory results.

*Weeds.**

315. Winders, C. W. 632.954: 577.17
Notes on weed control [in Queensland].
Qd agric. J., 1947, **65**: 115-21.
Deals first with hormone weed killers, their application as sprays, and the precautions to be taken in using them. Tentative recommendations are made for treating a number of weeds known to be susceptible to hormone herbicides. The control of nut grass by means of chemicals, frequent cultivation, livestock and flaming is briefly discussed. A procedure is suggested for dealing with Johnson grass using sodium chlorate, or a mixture of this with calcium chlorate.

316. Bassity, M. A. [Editor]. 632.954: 577.17
Eastern regional conference on the control of weeds harmful and annoying to man.
Leafl. Brooklyn bot. Gdn., N.S. **3**, 1947, pp. 10.
This conference was called to mobilize public opinion against tolerating plants detrimental to human health, and to show the public how to recognize such plants as ragweed and poison ivy, and how to organize control measures. Ammate is useful for the destruction of poison ivy. 2,4-D is preferable for ragweed; applied at a strength of 1 : 1,000 it will kill young growing plants, and a solution of 1 : 2,000 applied up to the time of flowering will prevent pollen dispersal.

317. Harvey, W. A., and Robbins, W. W. 632.954: 577.17
2,4-D as a weed killer.
Circ. Calif. agric. Ext. Serv. **133**, 1947, pp. 12.
In orchards 2,4-D has been used to control morning-glory and other perennial weeds, except grasses. Drifting spray has curled young growth, but no other adverse effects have been reported. 2,4-D may persist from one to six months or more, depending on soil type, moisture content, and temperature; tomatoes and other susceptible crops should not be planted after a spring application of the chemical.

318. Payne, M. G., and Fults, J. L. 577.17: 632.954
Some effects of ultraviolet light on 2,4-D and related compounds.
Science, 1947, **106**: 37-9, bibl. 5.
"The trend of the results indicates that ultraviolet light of the range and intensity described, when transmitted by filter 51, can be used to activate 2,4-D, the sodium salt, the butyl ester, and 2-methyl-4-chlorophenoxyacetic acid.

* See also 368-371, 643.

Comparative tests of the herbicidal effects of these chemicals activated with ultraviolet light and those of untreated chemicals are suggested. The results further suggest a possible explanation of the variable results secured from uniform trials of 2,4-D and similar compounds at different times and places."—Fort Collins, Colorado.

319. HAMNER, C. L., LUCAS, E. H., AND SELL, H. M. 632.954: 577.17
The effect of different acidity levels on the herbicidal action of the sodium salt of 2,4-dichlorophenoxyacetic acid.
Quart. Bull. Mich. agric. Exp. Stat., 1947, **29**: 337-42, bibl. 3.

The herbicidal action of the sodium salt of 2,4-dichlorophenoxyacetic acid can be greatly increased by its application in an acid solution. The pH range of 2·0 to 3·0 of unbuffered acid solutions gives optimum results if sufficiently strong acids are used. The titratable acid (within its non-injurious range) rather than the pH value of a solution accounts for the increased effect of the herbicide. [Authors' summary.]

320. PRIDHAM, A. M. S. 632.954: 577.17
Preplanting sprays to control weeds in nursery stock.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 351-4, bibl. 9.

2,4-dichlorophenoxyacetic acid used in the range of 15 to 75 pounds to the acre at the time of plowing gives promise of eradicating quackgrass and other perennial weeds whose roots constitute a menace from resprouting. *Taxus media Hicksii* and *Taxus cuspidata* were not seriously damaged at the time of planting when set in soil treated with 2,4-D. 2,4-D applied in amounts up to 37½ pounds per acre remains sufficiently active for 2 months at least for detection with red kidney beans but not with Victory oats. [Author's summary.]—Ithaca.

321. PRIDHAM, A. M. S. 632.954: 577.17
The effect of 2,4-dichlorophenoxyacetic acid applied at the time of seed germination in reducing stands of annual grasses.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 355-8, bibl. 6.

Trials at Ithaca indicate that repeated spraying of 2,4-D at 5,000 p.p.m. offers a possible control of annual grasses.

322. HITCHCOCK, A. E., AND ZIMMERMAN, P. W. 632.954: 577.17
Response and recovery of dandelion and plantain after treatment with 2,4-D.
Contr. Boyce Thompson Inst., 1947, **14**: 471-92, bibl. 6.

Three *Plantago* spp. were eradicated by a single treatment with 0·1% 2,4-D. Dandelion tops were killed by this treatment, but fresh growth appeared; annual treatment is suggested for eradicating this weed.—Yonkers, N.Y.

323. CARLSON, R. F. 634.75-2.577.17
Control of weeds in strawberry plantings by the use of 2,4-dichlorophenoxyacetic acid.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 221-3, bibl. 2.

Spraying against broad-leafed weeds with 2,4-D at 1,000 parts per million was successful without damage to the strawberry plants at any time in the first season of planting—in which no crop is required—and after harvest in the second year. Effects of different concentrations on particular strawberry varieties are noted.—Geneva, N.Y., and Chatham, Mich.

324. MITCHELL, J. W., AND BROWN, J. W. 632.954: 577.17
Relative sensitivity of dormant and germinating seeds to 2,4-D.
Science, 1947, **106**: 266-7, bibl. 5.

Results indicate that 2,4-D when used for killing noxious weed seeds in the soil is likely to be most efficient if applied at a time when the greatest number of such seeds are germinating.—Beltsville, Maryland.

325. KLEIN, L. G. 634.75-2.954: 577.17
Strawberries and 2,4-D.
Canad. Gr, 1947, **70**: 7: 8, 16.

The Premier strawberry tolerated a weed-killing spray of 1,400 p.p.m. of 2,4-D in July and August; two applications were made, three weeks apart. The method offers promise where grasses are not plentiful.

326. BRYANT, L. R., VINCENT, C. L., AND SHAFER, E. G. 634.11-2.954: 577.17
Bindweed control studies with 2,4-D in a bearing non-irrigated orchard in Eastern Washington.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 63-6.

The successful treatment of bindweed in an apple orchard with 2,4-D in 1945 and 1946 was followed in 1946 by the incidence of a rather large number of fruit abnormalities in McIntosh, Jonathan and Delicious apples harvested from the trees standing above the site. Some fruit showed only rudimentary or no seed development. In some the normal shape had changed, say, from round-conic to oblong-conic. There were many double fruits. These phenomena may have been due to translocation of 2,4-D through the roots, from drifting spray or from volatiles in the sprays.—Pullman, Wash.

327. WAGER, V. A. 632.5
Can rust kill the bramble ?
Fmg S. Afr., 1947, **22**: 831-2, illus.

The introduced American bramble, *Rubus fruticosus* var. *bergii*, is a serious pest in the midlands of Natal. During recent years the rust *Kuehneola albida* has been recorded as attacking the bramble, while in January 1947 a case was recorded where the rust almost cleared one farm of the weed. It is suggested that this rust might be spread in sprays with a view to controlling the American bramble. It is not yet known whether the rust attacks the 4 native brambles.—Botanical Station, Durban, S. Africa.

328. BARTLETT, J. V. 632.954
Ideas for eradicating bracken.
Repr. in *Qd agric. J.*, 1947, **65**: 154.

Four home-made implements are illustrated, three simple hand slashers and a horse-drawn drag made of heavy rails on chains.—S. Australia.

329. ANON. 632.954: 631.588.1
New tractors and implements.
Amer. Fr. Gr, 1947, **67**: 7: 14.

An electric weed control machine functions by electrocuting all types of weeds through their root systems [illustration only].

Vermin.

330. ANON. 632.693.2
[A paint to protect fruit trees from rabbits.]
Agric. Gaz. N.S.W., 1947, **58**: 416.

The Division of Horticulture of the Department of Agriculture, N.S.W., recommends the following mixture for painting trunks of fruit trees to prevent rabbits from eating the bark: 1 oz. bitter aloes, 1 lb. common soap cut up fine, 1 gall. water. The ingredients should be boiled for about 20 minutes, and when cool applied with a brush or swab to the butts of trees to a height of about 2 ft. 9 in. from the ground.

331. CARDINELL, H. A., AND HAYNE, D. W. 632.693.2
Pen tests of rabbit repellents.
Quart. Bull. Mich. agric. Exp. Stat., 1947, **29**: 303-15, bibl. 12.

To protect orchard crops against the cotton-tail rabbit (*Sylvilagus floridanus mearnsii*), various substances were

tested against a standard rosin 2 ethyl alcohol 1 mixture and they are here grouped according to their efficacy. Twelve mixtures are considered to be the equal of the standard. It would appear that differences in results from field trials are due to local differences in rabbits' food preferences and to differences in test conditions.

332. SMIT, B. 632.682
The destruction of harmful birds.
Fmg S. Afr., 1947, **22**: 846, 848, 901-2, 908.
The author stresses the fact that the damage done by birds is often exaggerated and the good they do usually overlooked. They should not be destroyed unless absolutely necessary. Various scares, traps and poisons are briefly dealt with, and a paragraph is devoted to methods for dealing with crows.

Control measures and substances.

333. HAMILTON, R. G. 634.1/7-2.9
Control of pests and diseases in the home orchard.
N.Z. J. Agric., 1947, **75**: 141-2.
A general account of the principles of disease and pest control, including a table of the symptoms in pome fruits, stone fruits, citrus and soft fruits, and a spray programme for the garden.

334. LEEFMANS, S. 632.95
Interne therapie bij planten tegen phytophage insecten en mijten in de Vereenigde Staten. **(Internal therapy of plants.)** [English summary ½ p.]
Meded. Direct. Tuinb., 1947, **10**: 130-5.
A review of work in America on internal treatment of plants to render them resistant to diseases and pests, with particular reference to the use of selenium compounds, one of which, under the name of Selocide, is now on the market.

335. HERMS, W. B. 612.014.44: 632.951
Some problems in the use of artificial light in crop protection.
Hilgardia, 1947, **17**: 359-75, bibl. 22.
A review of experiments made with artificial light, particularly with electrocuting light traps in the field for the control of insects. There are indications that colour, intensity and location of light affect the behaviour of phototactic insect pests; further experimentation must precede the design of traps harmless to beneficial insects. Codling moth.—White light, as a deterrent to egg laying, reduced worminess in an unsprayed apple orchard from 71% to 50%. Electrocuting traps with pale blue light (about 4,350 Å) were equally effective, but this degree of control is not economical. Inconclusive trials were made with the artichoke plume moth, *Platyptilia carduidactyla*, and the tomato fruitworm, *Heliothis armigera*. Economical and effective light traps in vineyards in the San Joaquin Valley produced greater yields of high quality grapes because of lessened damage by leafhoppers, *Erythroneura comes*; this promising method of control was abandoned because of outbreaks of Pierce's disease near the traps, apparently due to the attraction of other leafhoppers, vectors of this disease.

336. YOUNG, P. F. 632.95
New types of spraying and dusting equipment.
Trans. Ill. St. hort. Soc. for 1946, 1947, pp. 85-9.
The mist duster (for applying a concentrate), the aerosol fog generator (using high-pressure steam as the carrying agent), wet dusters, spray booms and masts, and the air-blast, or speed sprayer are briefly discussed. The first two are still in the experimental stage.

337. SHOFF, M. B. 632.95
New types of spraying equipment.
Trans. Ill. St. hort. Soc. for 1946, 1947, pp. 153-6.
After referring to the steady increase in the rate of spraying (2 men now do 40 acres per day) the author discusses some new machines including: the speed sprayer, the liquiduster, the fog generator and the mist duster.—Illinois.

338. TUKEY, H. B. 632.95
New approaches to orchard spraying.
Amer. Fr. Gr, 1947, **67**: 8: 16-17, 43-9, 53.
Recent developments in spraying are described. The larger sprayers, with booms bearing dozens of nozzles, have become too cumbersome; the heavy tanks required tend to compress the soil. Liquid dusters, fog generators, and air blast atomizers can be lighter and need much less of the spray base. A united approach is needed, in which engineer, entomologist, pathologist and chemist will co-operate with the horticulturist; he can make the tree fit the spraying scheme by adopting the most appropriate variety, spacing, rootstock, and pruning method.

339. WEINMAN, C. J., AND POWELL, D. 632.95: 656.7
The use of airplanes in the control of orchard pests, 1946 results.
Trans. Ill. St. hort. Soc. for 1946, 1947, pp. 110-21, bibl. 5.
The results obtained from dusting and spraying experiments on a 40-acre block of apple trees are reported. The general conclusion is that the best equipment for applying dusts and sprays from aircraft has yet to be found.—Illinois.

340. BALLU, T. 632.95: 631.588.1
Le poudrage électrique. **(Electric dusting.)**
Rev. hort. Paris, 1947, **119**: 333-4, illus.
An electrostatic, knapsack duster is described and illustrated. The machine can produce 50,000 volts. Much is hoped for from this new method of dusting crops. [See *H.A.*, 17: 2206.]

341. POWELL, D. 632.952: 634.1/7
Organic fungicides in the fruit pest control program.
Trans. Ill. St. hort. Soc. for 1946, 1947, pp. 122-30, bibl. 4.
A brief discussion on the composition and uses of the following organic fungicides which are likely to come on the American market soon: Fermate, Elgetol, Puratized Agricultural Spray, Phygon, Zerlate, 8-quinolinol derivatives, 2 heptadecyl glyoxilidine and Goodrite (Omilite). There are many others to come.

342. PETTY, B. K. 632.951
Some properties of new insecticides.
Fmg S. Afr., 1947, **22**: 889-96, bibl. 17.
An attempt is made to give an accurate picture of some of the properties of the following insecticides, based on research in different parts of the world: DDT (dichlorodiphenyl-trichloroethane), Rhothane or DDD (dichlorodiphenyl-dichloroethane), di(*p*-methoxyphenyl) trichloroethane, benzene hexachloride, Chlordane, Toxaphene or 3956, hexaethyl tetraphosphate, tetraethyl pyrophosphate, di(4-chlorophenoxy) methane or K.1875, Sabadilla, Azobenzene.—Div. of Entomology, Dep. of Agric., S. Africa.

343. DIVISION OF ENTOMOLOGY AND PARASITOLOGY, UNIVERSITY OF CALIFORNIA. 632.951
Investigations with DDT and other new insecticides in 1945.
Circ. Calif. agric. Exp. Stat. **365**, 1946, pp. 108.
This progress report consists of 28 articles by various authors on experiments with DDT against a number of insect pests, mostly of fruit and vegetable crops. Some of these articles are abstracted separately.

344. REIBER, H. G., AND STAFFORD, E. M. 632.951
DDT deposits and residues on olives, grapes, cabbage, green beans, and peas.
Circ. Calif. agric. Exp. Stat. **365**, 1946, 104-8.
Results obtained by the modified Gunther method as compared with those obtained by the nitration method are tabulated.

345. HOSKINS, W. M. 632.951
An analytical method for the determination of DDT deposits and residues during 1945 on grapes, pears, spinach, and animal hair.
Circ. Calif. agric. Exp. Stat. **365**, 1946, 102-3.
The procedure used depends on the liberation of water-soluble chloride from DDT by treatment with alcoholic alkali and subsequent titration with standard silver nitrate solution. Results are tabulated for grapes; in one series with DDT residues were found to vary from 0·9 to 9·7 p.p.m., in another from 0·5 to 5·8 p.p.m. A sample of pears was found to contain 7·5 p.p.m. of DDT.

346. CHANDLER, S. C. 634.25-2.7
Control of cat-facing and other peach insect problems.
Trans. Ill. St. hort. Soc. for 1946, 1947, pp. 255-72.
Despite favourable results, the author hesitates to recommend DDT because it destroys beneficial parasites, as well as pests.—Illinois.

347. BENNETT, S. H., KEARNS, H. G. H., AND MARTIN, H. 632.951
Investigations on egg-killing washes. III. The ovicidal properties of certain organic thiocyanates.
J. Pomol., 1947, **23**: 38-49, bibl. 10.
Tests of the ovicidal action of certain organic thiocyanates on the eggs of the green apple aphis (*Aphis pomi*), the apple sucker (*Psylla mali*), the winter moth (*Operophtera brumata*), and the fruit tree red spider mite (*Oligonychus ulmi*) are reported. The thiocyanates examined included certain recent commercial introductions in the Lethane series.—Long Ashton Res. Stat., Bristol.

348. MARCOVITCH, S. 632.95
Cryolite combats arsenic poisoning.
Amer. Fr. Gr, 1947, **67**: 8: 24, 41.
Experiments with rats and beans show that cryolite reduces the toxicity of lead arsenate in food and in the soil. Where both chemicals are used in the spray programme risks of poisoning are reduced; but if applied in combination their toxicity to insects is also reduced.—Tennessee Agricultural Experiment Stations.

349. ANON. 634.13-2.95
Spritzschäden an Birnen. **(Spray injury to pears.)**
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 352.
At Wädenswil, spraying against codling moth on 3 July, 1947, with 0·5% lime-sulphur +0·5% lead arsenate caused injury to fruits of early pear varieties. The sky was overcast, but caustic spots appeared on the fruits on the sunny side. It is assumed that in such circumstances lime-sulphur spray forms caustic products, in relatively large amounts, on drying.

Soil treatment.

350. JACKS, H. 631.462: 632.944
Tear gas experiments for soil disinfection.
Orchard. N.Z., 1946, **19**: 2: 3, 5.
Information on the use of chloropicrin for soil disinfection. It neither alters the physical structure of the soil nor leaves a toxic residue. Planting can be carried out 7 to 14 days after treatment.

351. FREMOUW, C. A. 632.944: 631.462
Over het ontsmetten van den grond met zwavelkoolstof. **(Disinfecting the soil with carbon disulphide.)**
Tijdschr. PlZiekt., 1947, **53**: 13-16.
A method for disinfecting the soil with CS_2 is described in detail, and the advantages and drawbacks are presented.

352. WALLACE, C. R. 632.944: 631.462
Small-scale tests with D.D.T. and benzene hexachloride incorporated in the soil.
J. Aust. Inst. agric. Sci., 1947, **13**: 132-7, bibl. 1.
An account of 4 pot-experiments from which it is concluded that soil " mixed with suitable quantities of DDT or benzene hexachloride should prove useful in protecting horticultural plants from soil pests. Treated soil could be used to grow crops in greenhouses; it might be used in seed beds, in the growing of potted plants, and possibly as casing soil in mushroom culture. Rows of nursery stock could be planted out in trenches filled with treated soil. In starting plantations, vineyards, etc., the young plants would be placed in their planting-holes, which would then be filled with soil suitably mixed with insecticidal dust ".—Sydney Botanic Gardens.

353. MADER, E. O. 631.458: 631.589
A corrective measure for " soil sickness " occurring in sand media.
Phytopathology, 1947, **37**: 682-3.
It was found that 1% sulphuric acid, applied at the rate of 5 gal. per 20 sq. ft. of bench space, had a corrective effect when soil sickness occurred in sand cultures. Chrysanthemum plants transferred from " sick " sand to treated sand recovered completely and formed healthy new roots.—Minnesota University Farm, St. Paul.

354. VAN KOOT, IJ., AND WIERTZ, G. 632.95
Onderzoek naar de afstervingstemperaturen van enkele voor de plantengroei schadelijke bodemorganismen. **(The death-temperatures of some soil organisms injurious to plants.)** [English summary ½ p.]
Tijdschr. PlZiekt., 1947, **53**: 121-33, bibl. 12.
The relation between the period of heating (x) and the death-temperature (y) can be expressed by a curve of the general form $(y-a)\sqrt{x}=b$. After sterilizing the soil by steaming it is desirable to keep it covered for about 3 hours. The following death-temperatures were determined: *Fusarium* spp. 70° C.; *Sclerotinia* sp., *Verticillium* (from cucumber) 60° C.; *Heterodera marioni* 55° C.; *Verticillium* (from tomato) and *Agriotes* (wireworms) 50° C. Tomato seed can be sterilized against *Verticillium* by immersing it in water at 45°-50° C. for half an hour, without injury.

Noted.

355.

a ALGERA, L., THUNG, T. H., AND VAN DER WANT, J. P. H. 632.8
Over het zuiveren van plantenviren. **(The purification of plant viruses.)** [English summary ½ p.]
Tijdschr. PlZiekt., 1947, **53**: 133-9, bibl. 12.

b ANON. 634.13: 632.768
De perebloesemkever. **(The pear blossom weevil.)**
Vlugschr. PlZiekt. Dienst, Wageningen, **57**, 1947, pp. 4.
DDT-containing spray recommended.

c AUBERT, P. 634.1/2-2.111
Dégâts du gel sur arbres fruitiers en montagne. **(Loss from frost in fruit trees at high altitudes.)**
Rev. romande Agric. Vitic., 1946, **2**: 71-2.
Nothing new.

d BALDACCI, E. 634.8-2.951
Epifitie di *Plasmopara viticola* (1941-46) nell' Oltrepò Pavese ed adozione del calendario di incubazione come strumento di lotta. **(The development of *Plasmopara viticola* in the district beyond the Po in northern Italy and the possibility of noting its incubation period with a view to control measures.)**
Att. Ist. bot. Univ. Pavia, 1947, Ser. 5, **8**: 44-85.

e BARLOW, F., AND HADAWAY, A. B. 632.951
Preliminary notes on the loss of DDT and Gammexane by absorption.
Bull. ent. Res., 1947, **38**: 335-46.

f BATEMAN, E. W., AND HEATH, G. D. 632.951
The generation of insecticidal smokes.
J. Soc. chem. Ind. Lond., 1947, **66**: 325-30, bibl. 3.

g BRAY, G. T., AND OTHERS. 615.779.1
The determination of the factor for pyrethrin I in the mercury method.
J. Soc. chem. Ind. Lond., 1947, **66**: 275-9, bibl. 4.

h BRIAN, P. W., CURTIS, P. J., AND HEMMING, H. G. 633.88: 632.4
Glutinosin: a fungistatic metabolic product of the mould *Metarrhizium glutinosum* S. Pope.
Proc. roy. Soc. Lond. B., 1947, **135**: 106-32, bibl. 29.

i CARTER, R. H. 632.951
Report on methods for the determination of DDT in insecticide residues and in animal products.
J. Ass. off. agric. Chem. Wash., 1947, **30**: 456-63, bibl. 27.

j CHAMBERLAIN, E. E. 632.8(931)
A list of plant virus diseases in New Zealand.
N.Z. J. Sci. Tech., 1946, **28**, Sec. A, pp. 234-7, bibl. 44.

k CHEVALIER, M. 634.13-2.76
L'anthonome du poirier (*Anthonomus pyri* Kollar). **(The pear bud weevil.)**
Rev. hort. Paris, 1945, **117**: 263-4 [received 1947].

l CIFERRI, R., AND OTHERS. 632.952
Indagini tossicometriche sugli anticrittogamici I-X and XI-XXII, XXIII-XXIX. **(Investigations on the measurement of toxicity in fungicides.)**
Att. Ist. bot. Univ. Pavia, 1943, Ser. 5, **1**: 86-213, 1944, **5**: 1-187, and 1947, **3***: 227-69.

m CIFERRI, R. 632.952
Recenti progressi italiani nel campo degli anticrittogamici. **(Recent progress in Italy on the use of fungicides.)**
Att. Ist. bot. Univ. Pavia, 1946, Ser. 5, **8**: 1-41.

n CLEVELAND, C. R. 632.6/7
Control of aphids, mites and red spiders.
Trans. Ill. St. hort. Soc. for 1946, 1947, pp. 190-201.

o FIERO, G. W. 632.951
Determination of chlorine in DDT insecticides.
Soap & San. Chem., 1947, **23**: 10: 147-51.

p FINNEY, G. L., AND OTHERS. 632.78: 632.96
Mass culture of *Macrocentrus ancylivorus* and its host, the potato tuber moth.
Hilgardia, 1947, **17**: 437-83, bibl. 41, being *Pap. Univ. Calif. Citrus Exp. Stat.* **560**.
For use against the oriental fruit moth.

* N.B., published later than vol. 5.

q LIMASSET, P. 634.75-2 +2.4
Les maladies du fraisier. **(Strawberry diseases.)**
Rev. hort. Paris, 1947, **119**: 239-40.

r MCINTOSH, A. H. 632.951
A dipping apparatus for estimating the toxicity of insecticides in liquid media.
Ann. appl. Biol., 1947, **34**: 233-9, bibl. 9.

s MARTIN, H. 632.9
The physicochemical factors affecting spray deposition and spray retention.
Reprint *Proc. VII. Intern. Ent. Congr. Berlin, 15-20 Aug., 1938*, 1940, pp. 3013-9 [received 1947].

t MARTIN, H. 632.951
The ovicidal properties of tar and petroleum oils.
Reprint *Proc. VII. Intern. Ent. Congr. Berlin, 15-20 Aug., 1938*, 1940, pp. 3020-1 [received 1947].
Summary of a paper read at the Congress.

u PIRIE, N. W. 632.8
The viruses.
Ann. Rev. Biochem., 1946, **15**: 573-92, bibl. 89.

v VAN DER PLANK, J. E. 632.3/8: 581.14
The relation between the size of plant and the spread of systemic diseases. I. A discussion of ideal cases and a new approach to problems of control.
Ann. appl. Biol., 1947, **34**: 376-87, bibl. 7.

w POUTIERS, R. 632.76: 634.11 +634.13
Les anthonomes et les nouvelles techniques de défense contre ces parasites. **(The blossom weevils [of apple and pear] and new control measures.)**
Rev. hort. Paris, 1946, **118**: 36-8 [received 1947].

x PUSSARD, R. 632.753: 632.96
Observations biologiques sur *Aphelinus mali* Hald. **(Biological observations on *Aphelinus mali* Hald.)**
C.R. Acad. Agric. Fr., 1947, **33**: 204-8.

y ROGERS, R. J. 634.3-2.111
Suggestions on orchard heating.
Calif. Citrogr., 1947, **33**: 5, 18.

z WALDO, G. F., AND OTHERS. 634.75-2.4
Breeding strawberries for resistance to red stele root disease.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 219-20.
To be published in full in *A.R. Peninsula hort. Soc.*

356.

a WILSON, E. E. 634.25-2.4
Depositional and weather-resisting qualities of some copper fungicides affecting the control of peach blight.
Hilgardia, 1947, **17**: 227-38, bibl. 8.

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS.*

General.

357. CROVETTO, R. M. 588.93(82): 635
Las umbeliferas cultivadas en la Republica Argentina, con una clave para su reconocimiento por medio de los frutos. **(*Umbelliferae* cultivated in the Argentine, with a key based on their fruits.**
Rev. Invest. agric. B. Aires, 1947, **1**: 3-51, bibl. 107.
A systematic account of the 17 species of *Umbelliferae* cultivated in the Argentine as vegetables, fodder, ornamental, condiment and medicinal plants. The key is clearly illustrated.

* See also 344, 345.

358. HUMM, H. J. 582.73
Agar—a pre-war Japanese monopoly.
Econ. Bot., 1947, **1**: 317-29, bibl. 22.
An account is given of the sources, manufacture, properties and uses of agar and related agaroids.—Duke University Marine Station, Beaufort, N.C.

359. BATEMAN, A. J. 631.531: 581.162.3
Contamination of seed crops. I. Insect pollination.
J. Genet., 1947, **48**: 257-75, bibl. 8.
II. Wind pollination.
Heredity, 1947, **1**: 235-46, bibl. 4.
The degree of contamination of seed crops depends on (1) the breeding system of the species, (2) isolation distance, (3) varietal mass and (4) pollinating agent. By experiments with radish, turnip, beet and maize it is shown that the effect of increased isolation on contamination is similar for wind-pollinated and insect-pollinated crops. The effect on contamination of the mass of a variety is as important as isolation. Commercial growers appear to use excessive isolation.—John Innes Horticultural Institution.

360. NORTH, C. 631.531.17
Artificial drying of vegetable and herbage seeds.
Agriculture, 1948, **54**: 462-6.
The performance of the following types of warm-air driers is discussed: the hop kiln, bag driers, the spear conditioner, stationary tray driers, mechanical tray driers and vertical tray driers. The temperature limits generally accepted in practice are set out, those for bean, onion and leek seed being 90° F. for a normal and 70° for a wet sample. After drying, seed should be cooled as rapidly as possible or it will absorb moisture from the air. The maximum moisture content at which certain seeds may be bagged for storage is shown. This varies from 9% for parsnips to 16% for peas. The carbide moisture tester is probably the most useful for general purposes, since electric meters need separate calibration charts for different kinds of seed. Some details are given of the special drying requirements of the following vegetable seeds: beets, peas, beans, onions and leeks.—Nat. Inst. Agric. Bot., Cambridge.

361. DIRECTIE VAN DE LANDBOUW. 635.1/8: 632.3/8
Plantenziekten en schadelijke dieren in de groentetuin. **(Vegetable garden diseases and pests.)**
Meded. PlZiekt. Dienst, Wageningen, **99**, 1947, 5th edition, 20 pp., f. 0.30.
A popular illustrated account of common diseases and pests of garden-grown vegetables in Holland with advice on their control.

362. DIRECTIE VAN DE LANDBOUW. 632.6/7 + 632.3/4
Overzicht van de belangrijkste ziekten en plagen van landbouwgewassen en haar bestrijding. **(The most important pests and diseases of agricultural crops and their control.)**
Meded. PlZiekt. Dienst, Wageningen, **92**, 6th edition, 1947, 123 pp. [alternate pages blank], illus, f. 1.
Certain garden crops are included, i.e. potato, peas, beans, onion, caraway and swede turnip.

363. LOO, T. Y., AND CHEN, S. M. 635.1/7: 577.16
Improvement of the vitamin content of vegetables. [Chinese.]
J. Agric. Ass. China, Suppl. No. 50, Abstracts of papers, 25th Annual Meeting, 1945, p. 20.
Addition of very small amounts (about 2 oz. per mou) [13 oz. per acre] of nickel or zinc compounds to soil considerably increases the vitamin A and P contents of pepper, tomatoes and peas.

364. MATHOT, H. J. 634.1/8 + 635.1/7
Modern kwaliteitsonderzoek van groenten en fruit. **(Improving the interior quality of fruits and vegetables.)**
Meded. Direct. Tuinb., 1947, **10**: 202-13.
From the data tabulated it is concluded that the internal quality of fruit and vegetables (sugar, acid-, ascorbic acid, and gel-content) is influenced by the variety, soil, manuring and time of harvesting.

365. BORTELS, H. 632.3: 581.05
Über die Abhängigkeit der Virulenz und anderer Eigenschaften pathogener Bakterien sowie des Infektionserfolges vom Wetterverlauf. **(The influence of weather conditions on the virulence and other properties of pathogenic bacteria and on the susceptibility of the host.)**
Festschr. O. Appel, biol. Zentralanst. Land-u. Forstwirtsch., Berlin-Dahlem, 1947, pp. 10-12, bibl. 5.
This preliminary communication contains reports of inoculation and other experiments with *Pseudomonas tumefaciens* in tomatoes, *Bacterium phytophthorum* in potatoes, and with *Pseudomonas tabaci* and *P. medicaginis* var. *phaseolicola* in tobacco and beans. The object was to investigate the effect of cyclones and anti-cyclones on the virulence of the pathogens and the resistance of the host. With both groups of organisms a ridge of high pressure had a stimulating effect, while a depression reduced vitality. However, it was found, in confirmation of earlier medical research, that the bacterium reacts more quickly to a change of conditions than does the more complex host. Thus, a change from low to high pressure was found to favour the pathogen, whereas a transition from high to low pressure increased the resistance of the host. Too many factors were involved in the tomato experiments to give conclusive results.—Biol. Zentralanst., Braunschweig-Gliesmarode.

366. OWENS, H. B., DITMAN, L. P., AND BURKHARDT, G. 632.951: 635.1/7
Liquefied gas aerosols for control of insects on eggplant and broccoli.
J. econ. Ent., 1947, **40**: 423-4, bibl. 2.
Eggplants were treated weekly with an aerosol containing 5% DDT. The protection from insects led to improved growth and far greater yield in the treated plants. The same aerosol applied to broccoli was effective against the cabbage worms, *Pieris rapae* and *Trichoplusia ni*, and reduced the cabbage aphid, *Brevicoryne brassicae*. The aphid population built up rapidly after treatment. Treatment did not affect growth.

367. ČAILACHJAN, M. H. 632.5
Development of different species of broomrape as connected with growth and development of their hosts.
C.R. Acad. Sci. U.R.S.S., 1947, **55**: 869-72, bibl. 7.
In order to assess the potential susceptibility of crops to broomrape infection, for breeding resistant varieties, the long-day and neutral species of sunflower, tobacco, mustard, etc., should be tested under conditions of short day, and the short-day species of sunflower and tobacco varieties, hemp, perilla and other crops should be tested under conditions of long day.

368. SWEET, R. D. 635.1/7: 632.954
Weeding* vegetables with chemicals.
Market Grs J., 1947, **76**: 10: 8, 21-4.
A popular account of progress in the chemical weeding of vegetables in New York State. The most successful example is the commercial control of weeds in carrots by spraying Stoddard Solvent at any time up to within a month of harvest. The use of salt or nitrate of soda for beet is not always satisfactory, as the common weeds, lamb's quarters and purslane, are not affected. For weeding asparagus cyanamide is satisfactory, except that grasses are not controlled; this chemical is also useful for onions, and it is easier to handle than sulphuric acid. Experimental work at Cornell now largely concerns pre-emergence weed killing; materials being tested include cyanamide products, hormones, di-nitro compounds, and petroleum products.

* See also 315-329.

369. HAVIS, J. R., AND SWEET, R. D. 632.954: 635.1/7
The value of certain aromatic naphthas and growth regulators as soil treatments for weed control in vegetables.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 325-31, bibl. 2.
Experiments at Ithaca, chiefly against purslane (*Portulaca oleracea*), pigweed (*Amarantus retroflexus*), galinsoga (*G. ciliata*), crab grass (*Digitaria sanguinalis*), gave the following indications:—2,4-D and methyl ester of α-naphthaleneacetic acid were very effective in control when applied at 7·5 lb. per acre before emergence of weeds, methyl ester being much less injurious to crops. Thiourea was ineffective. Aromatic naphthas are effective as contact herbicides but ineffective when applied before weed emergence.

370. LACHMAN, W. H. 635.1/7: 632.954
Pre-emergence spraying for weed control in vegetables.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 339-42, bibl. 10.
At Amherst, Mass., Stoddard Solvent in particular and certain other chemicals proved useful pre-emergence herbicides for vegetable crops. Such treatments should save early hand weeding. Methods of procedure which were applied to beds of turnip, parsnip, carrot, bean, sweet corn, seed and bulb onions, lettuce, beet and spinach are here described.

371. CARLSON, R. F. 632.954
Destruction of quackgrass rhizomes by application of isopropylphenylcarbamate.
Quart. Bull. Mich. agric. Exp. Stat., 1947, **29**: 274-80, bibl. 5.
Good results have been obtained by the application of isopropylphenylcarbamate to rhizomes of quack grass, *Agropyron repens*, in the greenhouse. Few leaves appeared after applications of 100 p.p.m.; no fresh growth was made with concentrations above 500 p.p.m. This chemical is a selective herbicide and it may be possible to use it against quack grass while cultivating row crops.

*Potato.**

372. SALAMAN, R. 633.491
Reports of the Potato Synonym Committee of the National Institute of Agricultural Botany on the trials of new seedling potatoes, carried out at the Midland Agricultural College, Sutton Bonington from 1943.
J. nat. Inst. agric. Bot., 1947, **5**: 184-95.
Variety reports are tabulated under the following headings: stock indistinguishable from an established variety; stocks too poor in growth to be judged; stocks too mixed in type to be judged; distinct varieties, first year stocks; distinct varieties—true to key plot—second year stocks; inter departmental check varieties, purchased stocks of synonyms; stocks not true to key; special test plots. The committee concludes that whilst it is satisfactory to note no new synonym has sprung up in the war years, it is disheartening to find that there are still traders who through ignorance, carelessness or frailty have failed to eliminate these false entries from their catalogues, from which it will be seen that the problem of synonyms and correct descriptions in seedsmen's catalogues is still a matter which demands the close attention of both the N.I.A.B. and the public.—Nat. Inst. Agric. Bot., Cambridge.

373. ANON. 633.491
Lord Derby Gold Medal [potato] trials, 1943-45.
J. nat. Inst. agric. Bot., 1947, **5**: 171-83.
The results of controlled variety trials carried out at three centres in England during 1943-45 are recorded. The following were tested against various standard varieties: Seedling 183/15, Home Guard (both early), Seedlings 273/48, 193/101, 653a(99), T(a) (=Dr. McIntosh), 655(43), 653c(35), 835a(4) and St. Aidan (all main crop). Descriptions are given of the tuber, foliage and flower characters of the above varieties. Seedling 273/48 was awarded a medal in 1944 and Seedling 655(43) in 1945. The judges were impressed by the behaviour of Seedling 835a(4) and recommended it for further trial.—Nat. Inst. Agric. Bot., Cambridge.

374. HAWKES, J. G. 633.491
Classification, breeding and preservation of the potato.
Nature, 1947, **160**: 843-4.
An account of a symposium arranged by the Association of Applied Biologists. Breeding, particularly for resistance to frost, blight, viruses and Colorado beetle, was discussed. Other subjects were potato storage in North America and the reduction of tuber diseases.

375. DE HAAN, H. 631.523: 633.491
The protection of the property of the potato breeder in the Netherlands.
Amer. Potato J., 1947, **24**: 374-7.
An account of the legal safeguards given in Holland to the breeders of new plant varieties.

376. HOGEN ESCH, J. A. 633.491-1.532.2
Actuele problemen rond de pootaardappel. (**Current problems concerning seed potatoes.**)
Landbouwk. Tijdschr., 1947, **59**: 400-7.
Five general questions are reviewed—competition in export trade, storage of seed harvested early, soils for growing seed potatoes, the behaviour of Dutch varieties abroad, the international aspect of the protection of growers' rights.

377. ARNAUTOV, V., AND NOVIKOV, F. 633.491
The potato research institute. [Russian:]
Kolhoznoe Proizvodstvo (Collective Farming), 1946, No. 4, 42-3.
The Koren Potato Research Station in the Uhtomsk region of the Moscow province was established 15 years ago. Problems assayed concern raising new potato varieties, agrotechnical projects for increasing good quality crops, control of diseases in the field and in storage, the construction and use of new machines, etc. New varieties have been raised, among them two which are early ripening and more resistant to blight than Epicure and Early Rose. In 1941 the institute investigated the possibility of using the crowns of potato as "seed". It was found that the crown slices gave a yield not inferior to that from ordinary seed; they should be stored at a temperature of 2°-5° C.

378. LORH, A. G. 633.491: 581.1
Biology of the potato and the conditions affecting its growth and development. [Russian.]
Proc. sci. Conf. Timirjazev agric. Acad. 1945, 1946, **3**: 26-7.
Among the factors affecting growth and development in the potato the time when certain operations are carried out has great significance. Thus early irrigations and applications of nitrogen fertilizers hasten ripening, increase starch production and improve the flavour and storage qualities of the tubers. When the haulm has attained its optimum weight its growth is arrested and there is a corresponding increase in the development of the tubers with a potassium fertilizer on podzols and with superphosphate on black earth.

379. HAWKES, J. G. 612.014.44: 633.491
The photoperiodic reactions of potato bolters.
Emp. J. exp. Agric., 1947, **15**: 216-26, bibl. 4, 3 figs.
The well-known differences between bolter and normal strains of the two potato varieties Gladstone and Sharpe's

* See also 113.

Express were shown to be well pronounced, especially in the latter. Under long days the bolter plants were significantly taller, matured earlier, flowered more freely, and had longer stolons than the normals. Under short days these differences were completely effaced. The results obtained show that the bolter, when grown under short days, is indistinguishable in most of its features from the normal, thus lending weight to the hypothesis that the change from normal to bolter is due to a mutation of one or more relatively unstable genes controlling response to day-length. According to this view the bolter is a reversion to the more ancestral type of short-day adapted potato such as is found under cultivation in the S. American Andes and from which our own domestic potatoes were probably derived. [From author's summary.]—Imperial Bureaux Potato Station, Cambridge.

380. FOLSOM, D. 633.491-2.19
Permanence of greening of potato tubers.
Amer. Potato J., 1947, **24**: 336-40, bibl. 4.
The effect of light, temperature and variety on greening is discussed.

381. WERNER, H. O. 633.491(782)
Commercial potato production in Nebraska.
Bull. Neb. agric. Exp. Stat. **384**, 1947, pp. 173.
The chief subjects of this very comprehensive treatise on the potato are: Soil requirements and management prior to planting, varieties, seed potatoes, management of field after planting, irrigation, pests and diseases, harvesting, transport of early potatoes, storage, handling late potatoes from cellar to car, marketing. A 9-page subject index is also provided.

382. MALMONTÉ, M. 633.491
Travaux effectués dans la région du Nord. **(Potato trials in the north of France.)**
Pomme de Terre fr., 1947, **10**: 5: 13-17.
A review of trials made in several districts in 1946, using the variety Bintje. Hot weather stopped growth early in July. Planting distance.—In lines 65-70 cm. apart, decreasing the distance between stands from 45 to 35 cm. led to greater yields of smaller potatoes. Size of seed.—Seed potatoes larger than usual produced a greater crop, but this was offset by the increased cost of the seed. Plant raised from seed harvested early in July, 1945, showed less virus attack than did those from seed harvested later.

383. TREADWAY, R. H. 633.491-1.57
Industrial utilization of cull and surplus potatoes.
Amer. Potato J., 1947, **24**: 361-74, bibl. 7.
Surplus potatoes of the 1946 crop in U.S.A. were disposed of as follows:—alcohol production 29·2%, deteriorated and lost 26·5%, fed to livestock 18·3%, exported 11·3%, as source of starch, flour and glucose 9·5%, direct relief to public institutes 3·2%, undetermined 0·5%. The advantages and disadvantages of different methods of processing are discussed.

384. VERHOEVEN, W. B. L. 633.491-1.532.2
Problemen bij de teelt van pootaardappelen. **(Problems in growing seed potatoes.)**
Landbouwk. Tijdschr., 1947, **59**: 415-20.
Great care is needed to produce good seed potatoes. The origin of the planting material must be reliable. Seed should be sorted carefully and sprouted before sowing; this encourages uniform growth and facilitates roguing. A sound knowledge of potato diseases is necessary at all stages; choice of plot and rotation depend on the life history of the diseases. Copper sprays should be applied regularly. Plants should not be dug up while still in leaf.

385. BROADFOOT, J. 633.491-1.532.2
Preliminary experiments on the protection of cut sets of potato from infection with penicillium.
Emp. J. exp. Agric., 1947, **15**: 227-36, bibl. 10.
An account of wartime experiments undertaken to solve the problem caused by *Penicillium* infection of single-eye potato sets intended for shipment to Malta and other Mediterranean countries at a time when transport was scarce and delays frequent. These trials included treatment with 5% boric acid solution, thymol- and diphenyl-impregnated peat, zinc oxide and Ceresan, all of which were effective if a good cork layer had been induced on the cut surface. Adequate suberization was found to be effective without the use of a fungicide, and it also prevented the sets from drying out, provided the storage temperature was controlled.—West of Scotland Agricultural College.

386. BALD, J. G. 633.491-1.532.2
The treatment of cut potato setts with zinc oxide. 2.* Infection of stems and tubers with *Rhizoctonia* and scab.
J. Coun. sci. industr. Res. Aust., 1947, **20**: 190-206, bibl. 6.
An analysis is made of the effects of treating cut potato sets with zinc oxide on stem lesions, the incidence of *Rhizoctonia* runner hyphae on the stems, and the incidence of scab and *Rhizoctonia* on the tubers. Some treatments with zinc oxide and the organic mercury dip reduced the incidence of lesions and runner hyphae on the underground stems. The zinc oxide treatments raised yield of clean sound tubers. Zinc oxide and mercury treatments gave partial or effective control of common scab. The treatments that were effective against scab raised the incidence of *Rhizoctonia* sclerotia on the tubers. Further investigation suggested an antagonism between *Actinomyces scabies* and *Rhizoctonia solani*. [From author's summary.]—Div. of Plant Industry, Australia.

387. TROFIMOVIC, A. JA. 633.491-1.532.2
Lengthening the storage period of potato tuber crowns by treating them with dusts. [Russian.]
Proc. sci. Conf. Timirjazev agric. Acad., 1945, 1946, 3: 99-101.
In a preliminary experiment rotting was less, in relation to controls, in tuber crowns treated with powdered chalk, lime and ashes, although there was no difference in the thickness of the suberized layer on the cut surface. Powdered charcoal also gave positive results. Lime, chalk, and—but less effectively—ashes reduced rotting in store.

388. BROWN, W. 633.491-1.532.2
Experiments on the effect of chlorinated nitrobenzenes on the sprouting of potato tubers.
Ann. appl. Biol., 1947, **34**: 422-9, bibl. 1.
The addition of a small quantity of a dust containing pentachloronitrobenzene to clamps of certain early and second-early potato varieties markedly reduces winter sprouting and protects the sprouts from damage by the fungus *Rhizoctonia solani*. A series of yield trials carried out over six seasons has shown that tubers which have been stored in clamps in presence of the dust give yields equal to those of chitted tubers. A dust containing a tetrachloronitrobenzene applied to potatoes kept in a closed space represses sprouting to a very pronounced degree. The possible use of this dust for conserving ware potatoes is suggested. [From author's summary.]

389. ULRICH, R. 633.491: 577.17
Influence de la température et de substances inhibitrices sur le développement des bourgeons et sur la respiration des tubercles de pommes de terre. **(The effect of temperature and growth inhibiting substances on the development of sprouts and on the respiration of potato tubers.)**
Rev. hort. Paris, 1946, **118**: 188-91, bibl. 11 [received 1947].
Tubers of Bintje potatoes were stored at 6°C. or 12° C., entire or with eyes removed, some being treated with the growth substances Rhizopon C and Ipnogerm at the rate

* For abstract of Part I, see *H.A.*, 17: 2266.

of 1 g. per kg. tubers. If the atmosphere is not too dry, the growth substances are unnecessary at 6° C. At 12° C. both substances inhibited sprouting in the early weeks, but became less effective later. Respiration of tubers was increased by Rhizopon C.—Station Experimentale du Froid, Bellevue.

390. JANNACCONE, A. 633.491-1.8
Ricerche sul lavoro radicale medio della patata. **(Root absorption in the potato.)**
Ann. Fac. Agrar. Portici, 1942/43, Ser. 3, **14**: 162-75 [received 1947].
Determinations of root content every ten days on pot grown potatoes at Portici showed that the greatest absorption of nitrogen and potash takes place between the 30th and 40th day from setting seed, while that of phosphate, which is much less, is more or less constant. Practical suggestions are made for the application of fertilizers founded on these observations.

391. LORENZ, O. A. 633.491-1.8
Studies on potato nutrition. III. Chemical composition and uptake of nutrients by Kern County potatoes.
Amer. Potato J., 1947, **24**: 281-9, bibl. 2.
In experiments at the U.S. Cotton Experiment Station at Shafter on a Hesperia fine sandy loam soil the greatest amount of growth and the greatest intensity of nutrient absorption occurred between 75 and 110 days from planting or 45 to 80 days after plant emergence. Nitrogen content of plants and tubers was increased by the application of N during the early but not during the later stages of growth. The highest yields which followed complete fertilizer treatment in 1946 amounted to 395 sacks per acre, and absorbed 139 lb. N, 36 lb. P_2O_5 and 253 lb. K, the tubers alone removing 106 lb. N, 31 lb. P_2O_5 and 196 lb. K.

392. MCLEAN, J. G., SPARKS, W. C., AND BINKLEY, A. M. 633.491(788)-1.8
Fertilizer studies with the Red McClure and Bliss Triumph varieties of potatoes in the San Luis Valley.
Tech. Bull. Colo. agric. Exp. Stat. **35**, 1947, pp. 20, bibl. 7.
The tests were carried out over a 4-year period in a highly variable, alkaline soil (pH 7·5-9·0) with a salt concentration of 2,000 p.p.m. and under highly variable climatic conditions. In spite of the heterogeneity of experimental conditions certain general conclusions were reached, the chief of which are quoted from the authors' summary: "Both varieties responded by yield increases to the application of 200 to 500 pounds per acre of complete fertilizers. Red McClure generally responded to all fertilizers but yielded best with a high phosphate, and high nitrogen and potash ratios in a complete fertilizer combination. The Bliss Triumph variety responded best to a complete fertilizer high in phosphate, high in nitrogen and low in potash. The use of sulfur applied in combination with a high phosphate complete fertilizer increased the yield of both varieties. Certain minor element combinations were beneficial to both varieties while some were of more benefit to one variety than to the other."

393. HOUGHLAND, G. V. C. 633.491-1.85
Minimum phosphate requirement of potato plants grown in solution cultures.
J. agric. Res., 1947, **75**: 1-18, bibl. 25.
Under the conditions of the experiment the potato plants made excellent growth in the nutrient solutions maintained at a phosphate concentration of approximately 1·5 p.p.m. When the phosphate concentration was reduced to 0·5 p.p.m. the height of the plants was only slightly reduced, but the production of dry matter and the percentage of phosphorus in the plants was definitely lowered. When the phosphate concentration of the solutions was reduced to 0·1 p.p.m., however, the plants were much smaller, phosphorus deficiency symptoms developed, and there was a pronounced reduction in both dry matter and phosphorus content.

394. NELSON, W. L., AND HAWKINS, A. 633.491-1.83 +1.85
Response of Irish potatoes to phosphorus and potassium on soils having different levels of these nutrients in Maine and North Carolina.
J. Amer. Soc. Agron., 1947, **39**: 1053-67, bibl. 13, being *J. Pap. N.C. agric. Exp. Stat.* **262**.
Response to applications of fertilizer depended on the availability in the soil of the element supplied. Analysis of leaves or rachises gave results in agreement with soluble P in soil +applied P and exchangeable K in soil +applied K. Phosphorus influenced the number of tubers per hill on soils low in readily soluble phosphorus.

395. ASAROV, H. K. 633.491-1.821
The effectiveness of liming soils under potatoes. [Russian.]
Proc. sci. Conf. Timirjazev agric. Acad. 1944, 1945, **2**: 127-30.
In the podzol zone of Russia liming the soil is one of the most important measures for increasing soil fertility. When potatoes come into the rotation, however, the high lime content has an adverse effect on the yield and the tubers become scabby. Under such circumstances the author advises the application of boron and magnesium.

396. WALLACE, T., AND HEWITT, E. J. 633.491-1.532.2-2.19
Effects of calcium deficiency on potato sets in acid soils.
Nature, 1948, **161**: 28, bibl. 2.
In sand culture acutely deficient in calcium, the sprouts of tubers of Majestic potatoes failed to emerge. The sprouts broke down immediately behind the growing point and then died off. After removal the tubers sprouted again normally. The failure of potatoes on very acid soils appears to be due to a deficiency of calcium, and not to the effects of toxic concentrations of elements such as manganese and aluminium.—Long Ashton Research Station.

397. CUNIN, G. 633.491-1.67
La culture irriguée de la pomme de terre. **(Potato growing under irrigation.)**
Fruits et Prim., 1947, **17**: 289-91.
This article, which is a sequence to one of the same title by M. Simonneau which appeared *ibid.*, 17: 250, noted *H.A.*, 17: 2434x, sets out to correct and augment some of the information given in the earlier article.

398. LAPAEV, P. 633.491-1.51
The economics of mechanization in potato culture. [Russian.]
Social. Seljsk. Hoz. (Socialist Agriculture), 1947, No. 2, pp. 46-52.
A discussion on the use and economics of tractor-drawn machines in cultivating and harvesting potatoes. Various data are tabulated or shown graphically.

399. AZIZBEKOVA, Z. 633.491-1.83
The effect of chlorides on tuber formation in potato. [Russian.]
Izvest. Azerbaĭdžan. Fil. Akad. Nauk S.S.S.R., 1944, No. 4, pp. 50-5 [received 1947].
An increase of chloride concentration in soil, induced by the addition of von Hoff's solution, resulted in deterioration in growth and tuber formation in potatoes.

400. BLODGETT, E. C. 633.491-2.19
Fasciation in Russet Burbank potatoes.
Phytopathology, 1947, **37**: 597-600.
In this disorder affected tubers have a common symptom, the fusion of buds on the bud end, expressed in varying

degrees. At intervals across the bud end are constrictions and ridges giving the appearance of a tightly sewn grain bag without ears, suggesting the name "stitched end". The exact nature or cause of this fasciation is unknown but it appears to be due to some genetic disturbance which is perpetuated in affected stock.

401. DIRECTIE VAN DE LANDBOUW. 633.491-2.1/8
Ziekten en beschadigingen van het aardappelloof. **(Diseases and disorders of potato foliage.)**
Meded. PlZiekt. Dienst, Wageningen, **6**, 21st edit., 1947, 18 pp., illus., f. 0.35.

An account of the chief virus and fungal diseases, pests and deficiency disorders affecting potato leaves. A table indicates the symptoms shown by 25 varieties of potato when infected with one or other of 6 viruses.

402. MÜLLER, K. O. 633.491-2.8
Über die Knöllchensucht der Kartoffel und eine weitere Keimungsanomalie der Kartoffelknolle. **(Anomalies in the sprouting of potato tubers.)**
Festschr. O. Appel, biol. Zentralanst. Land-u. Forstwirstsch., Berlin-Dahlem, 1947, pp. 37-9.

The potato disease "Knöllchensucht" is infrequent but serious. Affected tubers show no visible symptoms, but fail to produce foliar shoots; instead they give rise to stoloniform, plagiotropic shoots, which immediately start forming small tubercles. The evidence presented suggests that this trouble is a varietal character extending to the sexual offspring and becoming visible after unsuitable or overlong storage. Another anomaly was observed in tubers of an experimental strain, which were transferred from cold storage to a warm cellar in August. In them flowers were formed on young sprouts before the leaves had time to unfold.

403. RIGOT, N. 633.491-2.8
Étude des symptomes de l'enroulement primaire; influence de la fumure sur leurs manifestations. Transmission de la maladie. **(The symptoms of primary potato leaf roll and the influence of manuring on their appearance. The transmission of the disease.)**
Parasitica, 1946, **2**: 139-40.

The symptoms of primary leaf roll and its transmission are described. A rich nitrogenous manure slightly masks the symptoms, while manures containing much phosphoric acid and potash have the contrary effect.

404. BODE, O. 633.491-2.8
Beitrag zum frühzeitigen Nachweis der Blattrollkrankheit der Kartoffel durch Anfärbung des Phloems. **(The early detection of potato leaf-roll by staining the phloem.)**
Festschr. O. Appel, biol. Zentralanst. Land-u. Forstwirtsch., Berlin-Dahlem, 1947, pp. 34-6, bibl. 15.

A staining technique is described which makes it possible to detect phloem necrosis in the potato before leaf-roll symptoms of the virus disease appear. This supports the view that phloem necrosis causes disturbances in the conduction of reserve materials, which in their turn cause leaf-roll.—Biol. Zentralanst., Celle.

405. ROLAND, G. 633.491-2.8
Valeur de la technique de la bouture d'oeil pour l'étude de l'état sanitaire des plantes de pommes de terre. **(An evaluation of the bud technique for determining the state of health of potatoes.)**
Parasitica, 1947, **3**: 44-9.

From a two-year study of the bud eye testing method, first described by Blodgett and Fernow (*Phytopathology*, 1921, 11, p. 58), the author finds that the method is useful for detecting leaf roll but of less value for stipple streak and mosaic.

406. ROLAND, G. 633.491-2.8
Sur la résistance de défense des variétés de pomme de terre à l'égard du virus Y (*Solanum virus* 2. Orton). **(The defensive resistance of potato varieties with reference to virus Y.)**
Parasitica, 1946, **2**: 89-92.

Tubers of five potato varieties were inoculated with virus Y and planted. The tubers produced by these plants were used as sets the following year and the number of infected and of healthy plants yielded by them was recorded. From the data obtained it was concluded that the irregular distribution of virus Y in the progeny obtained vegetatively from an infected potato depends more on the degree of infection by the virus than on any inherited factor of resistance. The irregularity of transmission of the virus of an infected potato is due to defective diffusion of the virus to the different parts of the plant rather than to a defensive reaction of the tissues to the virus.

407. STÖRMER, K., AND VON BERNUTH, I. 633.491-2.8
Zur Bekämpfung der virösen Abbaukrankheiten der Kartoffel. **(The control of virus diseases in the potato.)**
Festschr. O. Appel, biol. Zentralanst. Land-u. Forstwirtsch., Berlin-Dahlem, 1947, pp. 27-9.

Up to the end of the war 87% of recognized German seed potatoes were grown in the eastern part of the country. Experiments carried out in central Germany in 1946 with tubers harvested in 1945, indicate that at altitudes of 270 m. and above virus-free seed crops can be grown.

408. HEINZE, K. 633.491-2.8
Über Spritzversuche an Kartoffeln zur Bekämpfung der virusübertragenden Blattläuse. **(Potato spraying trials for the control of aphid virus vectors.)**
Festschr. O. Appel, biol. Zentralanst. Land-u. Forstwirtsch., Berlin-Dahlem, 1947, pp. 31-4.

The results of pre-war spraying trials with nicotine preparations against the green peach aphid, *Myzodes persicae*, are reported and figures are given for the reduction in virus infection following a reduction in aphid population. In 1946 the experiments were resumed with DDT, Gesapon and the I. G. Farben preparation E 605f, developed from Bladan. The aphid control achieved with E 605f in one place was satisfactory and greatly superior to that obtained with DDT and Gesapon. Control measures are recommended if the aphid population exceeds 10-15 on 100 potato leaves collected from the bottom, central and top parts of the plants in the field. Repeated and thorough spraying is essential. E 605f is miscible with lime-copper and lime-arsenic preparations, so that aphid control may be combined with blight and Colorado beetle control.—Biol. Zentralanst. Celle.

409. ROZENDAAL, A. 633.491-2.8
Ziekten van het stengelbont-type bij de aardappel. **(Diseases of the stem-mottle type of the potato.)** [English summary 2 pp.]
Tijdschr. PlZiekt., 1947, **53**: 93-101.

The symptoms of the stem-mottle disease suggest that it is a virus disease, though they are very different from those of the typical potato virus diseases. The spots are much coarser and of a paler yellow than those of potato mosaic. The abnormal behaviour of the disease, in that the progeny is often only partially diseased, is caused by an absence of the virus in some tubers and not by masking of symptoms. Varieties show great differences in susceptibility.

410. CAIRASCHI, E. A. 633.491: 632.8: 633.71
La question des pommes de terre de sélection au voisinage des cultures de tabac. **(Separation of potato selection plots from tobacco.)**
Pomme de Terre fr., 1943, **6**: 3: 1-4, bibl. 1 [received 1947].

The virus diseases of potato and tobacco are tabulated with the method of transmission. Virus diseases of tobacco are not transmitted by aphids in France, but the plant serves as host to two important potato aphids; for this reason tobacco should not be grown within 100 m. of potato selection plots.—Centre National des Recherches Agronomiques.

411. DE BRUYN, H. L. G. 633.491-2.3
Wisselbouw van aardappelrassen als bestrijdingsmiddel tegen schurft. **(Rotation of potato varieties to control scab.)** [English summary ½ p.]
Tijdschr. PlZiekt., 1947, **53**: 139-43, bibl. 8.
Four potato varieties were grown in a frame, in soil heavily infested with scab (*Actinomyces*). For six successive years each variety was grown on the same plot; then two varieties were grown on all the plots. The attack and type of scab varied according to the susceptibility of the potatoes grown during the preceding period. The results agree with those of previous workers showing that different types of scab on the same potato are due to special races of *Actinomyces*, that the susceptibility of the different potato varieties to these *Actinomyces* races is not the same and that the virulence of the scab organisms is increased through development on the living growing potato.

412. REDDICK, D., AND PETERSON, L. C. 633.491-2.411
New blight-resistant varieties.
Amer. Potato J., 1947, **24**: 319-36.
Notes on the following varieties which have now all been released for increase:—Empire [reports not very good], Placid, Virgil, Ashworth and Chenango.

413. ROLAND, G. 633.491-2.411
La sensibilité de diverses variétés de pomme de terre à l'attaque de *Phytophthora infestans* (Mont.) de Bary. **(The susceptibility of potato varieties to blight.)**
Parasitica, 1946, **2**: 121-4, bibl. 3.
The intensity of attack of *Phytophthora infestans* on a number of potato varieties growing at Gembloux is recorded. The author concludes from the data that the virulence of *P. infestans* is similar in Germany, Belgium and Holland.

414. RUEHLE, G. D. 633.491-2.411
Recent spray tests for control of potato late blight in sub-tropical Florida.
Amer. Potato J., 1947, **24**: 299-307, bibl. 3.
Dithane-zinc sulphate lime has proved the most reliable spray treatment for late blight of potatoes in the sub-tropical Homestead section of Florida. It will also very effectively control early blight. It is an expensive treatment and is not very convenient to handle in the field. It is compatible with DDT and the combination shows promise.

415. CALLBECK, L. C. 633.491-2.411
A progress report on studies of the effects of varying the proportion of lime in bordeaux mixture for potato spraying.
Amer. Potato J., 1947, **24**: 377-81.
Field experiments conducted from 1943 to 1946 have shown that bordeaux mixtures in which the amount of hydrated lime is not greater than one-half the amount of copper sulphate are the most effective types of bordeaux mixtures against late blight of potato, and plants so sprayed give the highest yields. [Author's summary.]

416. SANFORD, G. B. 633.491-2.4
Effect of various soil supplements on the virulence and persistence of *Rhizoctonia solani*.
Sci. Agric., 1947, **27**: 533-44, bibl. 8.
Potato disease caused by *Rhizoctonia solani* was generally reduced by the addition of nitrogenous salts or cornmeal to soil artificially infested. This is attributed to antibiotic effects of the associated soil flora, stimulated by treatment.—Dominion Laboratory of Plant Pathology, Edmonton, Alberta.

417. THOMAS, D. C. 633.491-2.64
Some observations on damage to potatoes by slugs.
Ann. appl. Biol., 1947, **34**: 246-51, bibl. 7.
Significant differences in susceptibility to damage caused by the garden slug, *Arion hortensis* Fér., and the keeled slugs, *Milax* spp., were shown by three potato varieties. Arran Banner was most damaged, Arran Peak least, while Majestic was intermediate. The results confirm the need for prompt lifting of the potato crop on maturity, in order to avoid damage by slugs.

418. LANDIS, B. J., AND DAVIS, E. W. 633.491-2.654.2
Two-spotted spider mite damage to potatoes.
J. econ. Ent., 1947, **40**: 565, bibl. 3.
Potato plants that had been dusted with DDT were killed by the two-spotted mite, *Tetranychus bimaculatus*, in the Yakima Valley, Washington.

Fibres.

419. RICCARDO, S. 633.5-1.56
Si può migliorare la macerazione rustica subacquea delle piante tessili ? **(Improvement in methods of fibre retting.)**
Ann. Fac. Agrar. Portici, 1942/43, Ser. 3, **14**: 184-205, bibl. 15 [received 1947].
The fibre plants considered are hemp, ramie and *Araujia sericifera*.

420. BARBIERI, R. 633.522-1.531
Aspetti e soluzione del problema del seme di canapa in Campania. **(The production of hemp seed in Campania.)**
Ann. Fac. Agrar. Portici, 1943/46, Ser. 3, **15**: 85-127, bibl. 18.
Observations made indicate the possibility of producing good quality hemp seed in Campania rather than having to import it from Asia Minor. The chief necessity is for careful isolation in producing seed. It can be produced in association with sugar beet.

421. WAGER, V. A. 633.526.41-2.4
Wilt diseases of New Zealand flax [in S. Africa].
Fmg S. Afr., 1947, **22**: 871-88, bibl. 4, illus.
An account is given of what appears to be a new disease of *Phormium tenax*, which in 1943 ruined a young and thriving fibre industry in Zululand. Inoculation experiments indicate that the disease is caused by a *Fusarium* species, the main contributing factor being waterlogged soil.—Bot. Stat., Durban.

422. HARRISON, C. M., TYSON, J., AND ROBINSON, B. B. 633.528
Renovation studies on stands of common milkweed (*Asclepias syriaca* L.) in Northern Michigan.
Quart. Bull. Mich. agric. Exp. Stat., 1947, **30**: 86-91.
The pods of milkweed contain a floss that may be used as a substitute for kapok. The yield of volunteer stands may be increased by spring-tooth dragging, "quack-hogging" (with a wheeled field cultivator), ploughing, or a combination of these, provided they are carried out before the milkweed begins growth.

*Tobacco.**

423. ALLARD, H. A., AND ALLARD, H. F. 633.71
Andullo and perique—Dominican and Louisianan tobacco.
Agric. Amer., 1947, **7**: 123-6.
A description is given of the andullo and perique processes which are similar in that long-continued pressure is required

* See also 410.

in both, followed by months of slow curing and ageing. The end product is densely compacted and darkened almost to blackness by the reabsorbed juices and gums compressed from the original leaf mass. Six photographs.

424. ANON. 633.71(492)
Teelt van tabak in West-Vlaanderen. **(Tobacco culture in West Flanders.)**
Cultuur Hand., 1947, **13**: 5: 30-1.
With notes on cultural operations, the effect on quality of various fertilizers, harvesting and drying.

425. CURTEIS, W. M. 633.71(944)
The growing of *Nicotiana rustica*. To meet the demand for nicotine sulphate.
Agric. Gaz. N.S.W., 1947, **58**: 451-2.
In 1946 three hundred acres of *Nicotiana rustica* were grown in Australia and efforts are being made to increase the acreage considerably. Notes are given on its cultivation, harvesting and drying.

426. HILDEBRANDT, A. C., AND RIKER, A. J.
577.17: 633.854.78 + 633.71
Influence of some growth-regulating substances on sunflower and tobacco tissue in vitro.
Amer. J. Bot., 1947, **34**: 421-7, bibl. 21.
Excised tissue of sunflower and tobacco was cultured *in vitro*. The effect on growth of various indole, naphthalene, naphthoxy, and substituted phenoxy compounds was studied. Sunflower and tobacco tissue differed in their response, and it is considered that such cultures deserve attention as assays of certain growth substances.—University of Wisconsin.

427. STAIÉ, J., AND BOVAY, E. 633.71(494)
Contribution à l'étude de l'amélioration des tabacs indigènes (II). Influence de la fumure azotée sur la qualité et sur le rendement. **(The improvement of Swiss-grown tobacco (II)*. The influence of nitrogen applications on quality and yields.)** [German summary 1 p.]
Landw. Jb. Schweiz., 1947, **61**: 225-49, bibl. 2.
The effect of mineral nitrogenous fertilizers on the composition of tobacco plants varies according to whether the application is made to topped or untopped tobacco. Nitrogen compounds are hardly affected in either case, but total nicotine content increases considerably in untopped plants as the result of fertilizer applications. The effect on carbohydrate content, however, is considerable. In *untopped tobacco*, reducing substances decrease as a result of nitrogen manuring and the standard measures of quality, such as the Schmuck coefficient and the polyphenole content, are adversely affected. In *topped tobacco*, on the other hand, especially in soils not rich in organic nitrogen, moderate applications of mineral nitrogen have the effect of increasing the leaf carbohydrate and consequently of improving quality. In this case the fertilizer counteracts the inhibiting influence of topping. The trials suggest that a nitric fertilizer, applied at the rate of 40-60 kg. per hectare, will give the best results. Higher applications are liable to raise the nicotine content and to decrease the soluble carbohydrate content without increasing yields. Organic nitrogen was found to have considerable influence on size and development of plants. In order not to endanger quality, too generous applications of organic nitrogen should therefore be avoided. —Lausanne.

428. STEINBERG, R. A. 633.71-1.415
Effect of initial acidity on calcium and magnesium requirements of tobacco in aseptic culture.
J. agric. Res., 1947, **75**: 251-8.
Xanthi Turkish tobacco seedlings were grown aseptically on 50 c.c. mineral-salt solution in 200 c.c. Erlenmeyer flasks at 25° C. with 500 foot-candles of white fluorescent illumination. Increased acidity caused increased calcium and magnesium requirements, and greater growth decreases in the calcium than in the magnesium series.

* For Part I, see *ibid.*, 1940, p. 55.

429. ASKEW, H. O., BLICK, R. T. J., AND WATSON, J. 633.71-1.8
The effect of fertilizers and their manner of application on chemical composition of flue-cured tobacco.
N.Z. J. Sci. Tech., 1947, **29**, Sec. A, pp. 5-17, bibl. 6.
Variation in the rate of application of the standard 3-8-8 fertilizer had practically no effect on the chemical composition. Increasing the proportion of nitrogen in the fertilizer caused some increase in the nitrogen content, while increasing the proportion of potash slightly increased the potash but decreased the nitrogen content. Sulphate of ammonia, urea, and dried blood when used to supply the nitrogen in the fertilizer increased the nitrogen content above that of the standard. Some reduction in sugar content followed the use of sulphate of ammonia. Sulphate of potash gave higher nitrogen but lower sugar contents than the muriate. Greatly increased chlorine contents resulted from the use of muriate, while the sulphate appreciably increased the total sulphur content. Omission of nitrogen, potash, and phosphate from the fertilizer caused low values for these constituents in the leaf. The addition of magnesia as serpentine-superphosphate or as dolomite increased the magnesia and nitrogen contents of the leaf. Dolomite also reduced the sugar content. [From authors' summary.] —Cawthron Institute, Nelson, New Zealand.

430. BOWLING, J. D., AND BROWN, D. E. 633.71-1.83
Role of potash in growth and nutrition of Maryland tobacco.
Tech. Bull. U.S. Dep. Agric. **933**, 1947, pp. 28, bibl. 34.
The outstanding effect of potash was on the quality of the leaf. In Maryland tobacco the weight, colour, texture, combustibility, and hygroscopic properties of the cured leaf largely determine its quality; all these characteristics of quality were enhanced by potash fertilization. [From authors' conclusions.]

431. MCMURTREY, J. E. Jr., AND OTHERS.
633.71-1.432
Effects of controlled soil moisture on growth, composition, yield, and quality of Maryland tobacco.
J. agric. Res., 1947, **75**: 215-49, bibl. 19.
By irrigation and by withholding precipitation with movable canvas screens, dry and wet weather conditions were obtained simultaneously on adjacent areas, the treatments being continuous throughout the season on two areas and reversed late in the season on two others. The responses to the four treatments were compared with those of tobacco subjected to the prevailing weather conditions on a fifth area. Larger leaves with a lower weight per unit area were produced when irrigation was used as a supplement to rainfall during the early part of the season or throughout it. Cured leaf from irrigated tobacco absorbed more moisture when exposed in a constant-temperature and humidity room than leaf grown under dry conditions. Outstanding were the higher potash percentage in leaf of plants grown on irrigated areas, and the higher nitrogen and nicotine content of leaf from plants grown under dry conditions throughout the growing period or during early growth. The average yield, value and price per pound of leaf tobacco were enhanced and the fire-holding capacity improved by using supplemental water.

432. ASKEW, H. O. 633.71-2.19: 546.27
Lime-induced boron deficiency in tobacco at Umukuri, Nelson, New Zealand.
N.Z. J. Sci. Tech., 1946, **28**, Sec. A, pp. 161-6, bibl. 3.
A stunting of tobacco plants accompanied by chlorosis

and curling of the leaves was due to boron deficiency induced by liming. A warning is issued against too free use of limestone on sandy tobacco soils.

433. WALLACE, G. B. 632.8: 633.71
Kromnek disease.
E. Afr. agric. J., 1947, **13**: 103-6, bibl. 8, illus.
A note of warning on this serious virus disease, new to Tanganyika, where it has been reported on tobacco and sunflower.

434. BAWDEN, F. C., AND ROBERTS, F. M. 612.014.44: 632.8: 633.71
The influence of light intensity on the susceptibility of plants and certain viruses.
Ann. appl. Biol., 1947, **34**: 286-96, bibl. 5.
Reducing the light intensity under which plants were grown in summer to one-third increased their susceptibility to infection with tobacco necrosis, tomato bushy stunt, tobacco mosaic and tomato aucuba mosaic viruses. The importance of controlled illumination in raising plants for virus work is discussed.

435. VALLEAU, W. D. 633.71-2.4
Clubroot of tobacco: a wound-tumorlike graft-transmitted disease.
Phytopathology, 1947, **37**: 580-2.
Clubroot of tobacco was shown to be transmissible by grafting. Vectors of the virus are agallian leaf hoppers.

*Pyrethrum.**

436. FRANSEN, J. J., WESTENBERG, L., AND TERPSTRA, P. 632.951
Chemisch en biologisch onderzoek van verschillende pyrethrumpoeders. **(Chemical and biological investigation of various pyrethrum powders.)**
Tijdschr. PlZiekt., 1947, **53**: 1-10, bibl. 11.
Pyrethrum flowers grown in Holland were found to be equal to foreign products in content and activity of pyrethrin.

437. CHAMBERLAIN, E. E., AND PROCTER, C. H. 632.951: 615.779.1
Investigations on growing pyrethrum in New Zealand. I. Methods of propagation, cultivation, harvesting and drying.
N.Z. J. Sci. Tech., 1947, **28**, Sec. A, pp. 353-61, bibl. 16.
Plants raised from seed were very variable in growth type, while those propagated by rooted or soft-shoot cuttings produced even lines of plants. A spacing of 1 ft. between plants and 2 ft. between rows was satisfactory. The most satisfactory method of harvesting the flowers was with a fixed comb. Flowers were dried successfully in the shade on scrim-covered wire-netting frames or in an electrically heated, forced-draught drier.

438. B[RAY], G. T. 632.951: 615.779.1
The determination of pyrethrins.
Bull. imp. Inst. Lond., 1947, **45**: 23.
Includes a note on efforts being made to decide upon the most reliable method for determining the pyrethrins content of pyrethrum flowers. Forty laboratories throughout the world have agreed to co-operate in the study of existing analytical methods.

439. HUANG, C. F. 632.951: 615.779.1
Experiments on the hastening of flowering of pyrethrum. [Chinese.]
J. Agric. Ass. China, Suppl. No. 50. Abstracts of papers, 25th Annual Meeting, 1945, pp. 14-15.
The investigation aims at shortening the vegetative period of pyrethrum. It is hoped that the plants sown in autumn can be harvested next spring, thus reducing the growing period from 22 to 6 months, and eliminating the loss due to root rot which may result when the plants are left in the field over summer. Planting early in the autumn, 3 plants per hill, and applying plenty of fertilizer gave very promising results.

440. BECKLEY, V. A. 632.951: 615.779.1
Chemical and biological valuation of pyrethrum.
Kenya Pyrethrum News, 1947, **2**: 2: 6-7.
An outline is given of methods for determining pyrethrins. Biological tests are described, and the difficulties in standardizing test sprays and test insects are discussed.—Scott Agricultural Laboratories, Nairobi.

Hops, herbs, drugs, etc.

441. KEYWORTH, W. G. 633.79-2.48
***Verticillium* wilt of the hop (*Humulus lupulus*). II. The selection of wilt resistant varieties.**
J. Pomol., 1947, **23**: 99-108, bibl. 1, illus.
A description is given of the methods by which hop varieties have been selected for resistance to *Verticillium* wilt and further tested in commercial gardens. The results show conclusively that under the conditions of the experiments the three varieties OB53, OM26 and AEE55 were highly resistant to wilt, and suggest that the varieties 219, 1147 and OR55 may be regarded as moderately resistant. Notes on the characters of all the selected varieties were published in the Annual Report of the East Malling Research Station for 1946.—East Malling Res. Stat., Kent.

442. HUTSON, R., JONES, E. L., AND BENNE, E. J. 633.822-2.76
Use of DDT in the control of the mint flea beetle.
Quart. Bull. Mich. agric. Exp. Stat., 1947, **29**: 283-5, bibl. 7.
One timely application of 3% DDT at 40 lb./acre effectively controls the mint flea beetle. The authors' experiments lead them to conclude that, while DDT may be distilled over in the preparation of peppermint oil from crops so dusted, there is no risk to the consumer of peppermint-flavoured materials.

443. MUGANLINSKAJA, D. I. 633.84
***Asperula arvensis* as a source of enzyme.** [Russian.]
Priroda (Nature), 1947, No. 1, p. 97.
A very active enzyme, to which the name asperulin has been given, was found in *Asperula arvensis* L. It is entirely absent from the roots; a little of it is in the stems, but most of it is in the leaves and inflorescences; it is present in its most active form in the seeds. It can curdle milk and be used in cheese-making. The root contains a red dye. The plant is readily eaten by stock.

444. DORLAND, R. E., AND WENT, F. W. 633.842: 581.14
Plant growth under controlled conditions. VIII. Growth and fruiting of the chili pepper (*Capsicum annuum*).
Amer. J. Bot., 1947, **34**: 393-401, bibl. 5.
Chili pepper plants were grown to maturity under different controlled external conditions. For vegetative growth it was found that the optimal night temperatures for stem elongation gradually decreased from 30° to 8·5° C. as the plants progressed to maturity. Under low temperature conditions the plants were benefited by longer photoperiods. Leaf size was optimal at 12·5° C. night temperature, and the rate of formation of new leaves was greatest at 26° C. night temperature. Due to leaf drop at the higher night temperatures, the largest leaf surface per plant was found at 20·5° C. night temperature. Day temperature did not affect the above results; plants grown at 26° C. were larger than those grown at 18° C. day temperature. Flowering was most abundant at 20·5°-15·5° C. night temperature for young

* See also 359.

plants, but in older plants the optimum night temperature shifted to 8·5° C. The same was true for fruit set. Depending on the age of the plant the optimal night temperature for total fruit weight shifted from 20° to 12° C. [Authors' summary.]—California Institute of Technology, Pasadena.

445. ANON. 633.846
Horse radish (*Cochlearia armoracia*).
Tasm. J. Agric., 1947, **18**: 51.
A brief note on the cultivation of horse radish.

446. SAVČUK, O. 633.846
Horseradish potentialities. [Russian.]
Priroda (Nature), 1947, No. 1, pp. 96-7.
The juice and volatile compounds of horseradish have been shown to destroy germs of *B. typhi abdominalis*, *B. paratyphi*, *B. coli commune*, *B. dysenteriae*, and *Proteus vulgaris*; and to preserve at room temperature meat and fruit from decay.

447. KONJUKOV, I. 633.85(47)
The distribution of the oil culture industry in the new five-year plan. [Russian.]
Social. Seljsk. Hoz. (Socialist Agriculture), 1947, No. 3, pp. 24-33.
The plants producing seed oils in the U.S.S.R. are many and varied; they include sunflower, flax, mustard, castor oil plant, gold of pleasure [*Camellina sativa*], rape, groundnut, soybean, perilla, sesame, safflower [*Carthamus tinctorius*] and oil poppy. An account is given of the distribution of the areas in the U.S.S.R. in which those crops are grown. Each crop is discussed in turn in relation to the acreage cultivated and the possibility of extending its cultivation. The average yields in centners per ha. for these crops in the various provinces of the U.S.S.R. are tabulated.

448. KOKINA, S. I., AND KOKIN, A. JA. 633.879
The content of tanning substances in species of *Calligonum*. [Russian.]
J. Bot. U.R.S.S., 1947, **32**: 1: 23-32.
Six species were studied. In Turkmenia, they grow in the desert sands. The osmotic pressure of the plants is rather low and the rate of transpiration, compared with that in other similar types of plant, is rather high. The optimum conditions of growth are found in non-saline and well-moistened sand. The content of tanning substances is at its highest in the youngest portion of the plant during the hottest and driest part of the year, when it may amount to about 13%. The water extract is easily filtered. The flowers are very decorative and fragrant. Some of the species yield good timber. All of them are easily propagated by cuttings and are good sand-binders.

449. HATT, H. H., AND HILLIS, W. E. 633.88
The manna of *Myoporum platycarpum* R.Br. as a possible commercial source of mannitol.
J. Coun. sci. industr. Res. Aust., 1947, **20**: 207-24, bibl. 26.
M. platycarpum yields an exudate in which mannitol forms 60% to 80% of the total solids. In a single year a tree may produce 11 lb. of mannitol. The total solids of the exudate vary from 13% to 26%; the manna to which it dries usually contains about 90% of total solids, 70% to 80% of which is mannitol. Mannitol is present in the leaves (2·2%) and the bark (0·6%) of a healthy tree. A process of large-scale isolation of mannitol from this exudate is described. Before attempting to decide whether large-scale preparation of mannitol from manna is economically possible, a method must be found for inducing exudation at will and maintaining it over a period of years. The annual yields of mannitol per tree is comparable with those of rubber and turpentine.—Victoria, Australia.

450. HOCKING, G. M. 633.88
Henbane—healing herb of Hercules and of Apollo.
Econ. Bot., 1947, **1**: 306-16.
An account of the cultivation of *Hyoscyamus niger*, and of the preparation, chemical analyses, and uses of the drug. Most of the henbane consumed in the United States is now grown there.

451. HANDA, K. L., AND OTHERS. 633.88
Indian henbane.
Curr. Sci., 1947, **16**: 315, bibl. 2.
The alkaloid content of henbane, *Hyoscyamus niger*, grown in India below 5,000 ft. a.s.l. is reported as not up to B.P. standard whereas the leaf when grown at over 5,000 ft. in Kashmir exceeded B.P. and U.S.P. standards.—Drug Res. Laboratory, Kammu Tawi, India.

452. SPENCER, C. F., AND OTHERS. 633.88.51
Survey of plants for antimalarial activity.
Lloydia, 1947, **10**: 145-74.
A report describing data secured from screening tests for antimalarial activity made on about six hundred different plants representing one hundred and twenty-three phanerogamic and three cryptogamic families. For the botanical work the resources of the New York Botanic Garden were used. The chemical and pharmacological procedures are described and the results are set out in a comprehensive table. Although extracts of different parts of a number of plants showed significant suppressive activity against *Plasmodium gallinaceum* in the chick, none appeared to contain active principles which offered unqualified therapeutic promise for malarial infections in man.

453. POLOVENKO, I. 633.913(47)
Distribution of rubber-bearing crops and their specialized cultivation on collective farms. [Russian.]
Social. Seljsk. Hoz. (Socialist Agriculture), 1947, No. 7, pp. 49-53.
Although kok saghyz grows well in many districts of the U.S.S.R. its chief zones of cultivation under the new five year plan are in the Ukrainian and Belorussian S.S.Rs. Of some commercial importance are the crops of guayule and tau saghyz which have been grown hitherto only in certain regions, the former in Azerbaïdžan and the latter in southern Kazahstan. Four suitable crop rotations for collective farms cultivating kok saghyz are described in some detail. On a number of collective farms practising advanced system of crop rotation the income from kok saghyz plantations represented 21-84% of the total annual income from all field crops and 18-45·6% of the total annual income from all sources. Such experience indicates that specialized cultivation of kok saghyz would be economically advantageous in certain districts.

454. KOLESNIK, I. 633.913
Hand nest sowing of kok saghyz. [Russian.]
Kolhoznoe Proizvodstvo (Collective Farming), 1946, No. 2-3, pp. 25-7.
A brief historical account is given of the search for rubber-producing plants in U.S.S.R., the discovery of kok saghyz in the valleys of eastern Tjan-Šan (Tien Shan), its introduction to Russian agriculture and the regions where it is now grown. The various methods of sowing that were tried are described, leading up to the recommendation by Lysenko of "hand nest" sowing or clump planting [*H.A.*, 16: 883-5]. The chief advantages of hand nest sowing are reduced labour costs and larger roots.

455. NISHIMURA, M. S., HIROSAWA, F. N., AND EMERSON, R. 633.913: 581.192
Rubber from guayule.
Industr. Engng Chem. (*Industrial Edition*), 1947, **39**: 1477-85, bibl. 18.
It is suggested that the quality of guayule rubber may be improved so as to allow it to compete with hevea rubber. The main features of the authors' process are: the chopped shrub is cooked in caustic soda before milling; a Jordan-type mill is used instead of the usual pebble mill; and resin is removed by acetic acid.—California Institute of Technology, Pasadena.

456. Erickson, L. C., and Benedict, H. M. 633.913: 581.48
Origin of the seed coats in guayule.
J. agric. Res., 1947, **74**: 329-35, bibl. 10.
The achene of guayule (*Parthenium argentatum*) contains a seed enclosed by two seed coats, a thin, soft outer one originating from the outer cell layer of the integument, and a thin, tough inner coat composed of a membrane and one or two cell layers of living, thick-walled endosperm cells.

457. Romney, V. E. 633.913-2.654.2+2.752
DDT emulsion to control red spider and mealybugs on guayule.
J. econ. Ent., 1947, **40**: 480-3, bibl. 9.
An emulsion containing 0·3% of DDT, 0·6% of benzene, 0·3% of white oil, and 0·01% of emulsifier applied with a paint gun to guayule plants was found to be very effective against populations of the two-spotted mite, *Tetranychus bimaculatus*, and the Mexican mealybug, *Phenacoccus gossypii*, in the greenhouse. This emulsion did not injure the most susceptible types of growth of guayule even after repeated applications. Populations of these forms on wetted leaf or stem surfaces were killed by the spray within 48 hours or less, although final counts for mites were not made until 8 or 9 days after treatment, and mealybugs were left 22 days. Red spider eggs were all killed. Portions of some egg masses of the mealybug escaped, but most of the mealybugs were killed after hatching by the residual effect of DDT on the plant. [From author's summary.]—Salinas, Calif.

Garden vegetables, salads, etc.

458. Dunn, E. 635.12: 632.793
Outbreak of the turnip sawfly (*Athalia rosae* L. (=*Colibri* Christ)) in Jersey.
Ent. mon. Mag., 1947, **83**: 279, bibl. 2.
An epidemic of the turnip sawfly in Jersey, where crop rotation is not practised, was due largely to the fine weather in 1947, which was ideal for both adults and larvae.—States Experimental Station, Jersey.

459. Nylund, R. E. 635.13-2.954
The use of chemicals for the control of weeds in carrots.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 332-8, bibl. 13.
In trials at St. Paul and other places in Minnesota the best control of carrot weeds without reduction in yield was achieved by Stoddard Solvent applied once at 80 gal. per acre. Kerosene gave good control in 2 out of 3 tests. Petroleum oils in the range of 16% to 24% aromatic compounds also gave good control without injury. Oils with more than 24% aromatics injured stand and yield of carrots. Weedone, Sinox and 2,4-D in various solvents were unsuitable. All materials, if applied more than once, reduced yields.

460. Lachman, W. H. 632.954: 635.13/14
The use of oil sprays as selective herbicides for carrots and parsnips. III.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 343-6, bibl. 13.
Continued research and large-scale commercial use [in Massachusetts] indicate that Stoddard Solvent provides an admirable selective herbicide for members of the umbelliferae family if applied properly, and while the plants are small. High air temperatures and moisture on the leaves at the time of spraying may induce some plant injury, however. Where adequate precautions have been observed the yield of crops has not been affected adversely by spraying with Stoddard Solvent. [Author's summary.]

461. Allen, M. W. 632.651.3: 635.13
Control of root-knot nematode with D-D mixture and chloropicrin.
Circ. Calif. agric. Exp. Stat. **365**, 1946, pp. 62-5.
The root-knot nematode damages truck crops, fruit trees, and ornamentals in California. In the experiments described D-D (a crude mixture of 1,3-dichloropropene and 1,2-dichloropropane) was applied at the rate of 100, 200, and 300 lb. per acre with an 18-inch interval between injection points and one dosage at 200 lb. per acre at 12-inch intervals. The chloropicrin was applied at the rate of 200 lb. per acre at 12-inch intervals. Carrots were planted on the plots 6 days after the treatment. The yield, stand and subsequent growth was significantly better on treated than on untreated plots.

462. McLean, D. M. 635.15: 632.4
Alternaria blight and seed infection, a cause of low germination in certain radish seed crops.
J. agric. Res., 1947, **75**: 71-9.
Four species of *Alternaria* have been isolated from low-germinating radish seeds in Michigan, the most common being *A. raphani* which infects leaves, stems, pods and roots. Fungicidal dust treatments of low-germinating seeds did not give significant increases in percentage of seedling counts. Hot water treatment for 25 min. at 50° C. killed the *Alternaria* in infected seeds, but did not increase germination percentages in low-germinating seed lots.

463. Ustinova, E. I. 635.24
The fecundity of interspecific hybrids of *Helianthus tuberosus* L. × H. *annuus* L. [Russian.]
Priroda (Nature), 1947, No. 4, pp. 56-60, bibl. 13.
A cytological study of hybrids between the Jerusalem artichoke and the annual sunflower, raised by Ščibrja (*Vestn. Gibridiz.*, No. 1, 1941). The author envisages these plants as a new source of sugar (from the stems) and a possible source of rubber from the leaves.

464. Fedorov, G. V. 635.25: 631.521.6
Cold-resistant hybrid onions. [Russian.]
Proc. Kirov Agric. Inst. Omsk, 1939, Vol. **4** (17), pp. 133-36 [received 1947].
Allium cepa is exacting and is not cold resistant. *A. fistulosum*, however, can pass winters unharmed, though it has not a well-formed bulb. *A. altaicum* is also hardy, and in addition has a distinct bulb. These species, as well as the varieties Zitau (Citausskiĭ onion), Rubcov, Bessonov, Rostov, and Pogarskiĭ, were accordingly used for mutual crossing. The hybrid plants failed to produce pollen, but were heterozygous and hardy; some of them developed good bulbs.

465. Campacci, C. A. 635.25: 632.4
A podridão branca do alho e da cebola. (White rot of garlic and onions.)
O Biológico, 1946, **12**: 279-81.
White rot of onions and garlic, caused by *Sclerotium cepivorum*, may be controlled by these means: seed selection, destruction of crop residues, crop rotation (up to 8 or 10 years between crops of this sort), elimination of sources of infection, cultural methods (avoiding damp or compact soils).

466. Reimers, F. E. 612.014.44: 635.25
Effect of localized photoperiodic action upon bulb formation in *Allium cepa* L.
C.R. Acad. Sci. U.R.S.S., 1947, **55**: 457-60, bibl. 14.
It was found that, when some of the leaves of an onion shoot are placed under long day and others under short day conditions, the stimuli received from the two sets of leaves were different. Bulb formation is the faster, the greater the proportion of leaves placed under long day conditions.

467. Lange, W. H. 635.25: 632.73
Tests with DDT and other materials for the control of onion thrips on onions in the Salinas Valley.
Circ. Calif. agric. Exp. Stat. **365**, 1946, pp. 39-45.
Certain spray and certain dust combinations containing

DDT are of value in controlling onion thrips. Of the sprays, the DDT-oil emulsions gave the best reductions in nymph populations. Of the dust mixtures, DDT with 75% dusting sulphur was superior to DDT with other inert carriers. A new chemical, dichlorodiphenyl-dichloroethane (DDD) showed promise for onion thrips control both in dusts and sprays.

468. CHAPMAN, A. J., RICHMOND, C. A., AND FIFE, L. C. 632.73: 633.51 + 635.25
Comparative toxicity of benzene hexachloride and DDT to thrips on cotton and onions.
J. econ. Ent., 1947, **40**: 575-6.

On onions benzene hexachloride dust applied at the rate of 0·56 lb. of the gamma isomer per acre gave control of the onion thrips, *Thrips tabaci*, at least equal to that given by DDT dusted at 1·47 lb. or sprayed at 0·96 lb. per acre. Neither chemical damaged the plants as applied in these tests.—Texas Agricultural Experiment Station.

469. HOERNER, J. L., AND EDMUNDSON, W. C. 635.25: 632.73
DDT and other treatments for the control of onion thrips.
J. econ. Ent., 1947, **40**: 603-5, being *Sci. Ser. Pap. Colo. agric. Exp. Stat.* **250**.

Plots protected by several applications of DDT in water suspension or in dust gave the greatest yields of onions and carried low population of thrips, *Thrips tabaci*. Yields were also increased by the use of DDT with sulphur, or as an emulsion, and by benzene hexachloride.

470. MAAN, W. J. 635.25: 632.77
Zaadbehandeling met D.D.T. tegen de uienvlieg. **(Seed treatment with DDT against the onion maggot.)**
Tijdschr. PlZiekt., 1947, **53**: 11-13.

DDT proved to be as good or perhaps even better than calomel for treating the seed of onion and leek against the onion maggot *Chortophila antiqua*. The seed is coated with glue and then stirred with the insecticide. The dose was 40 g. of a DDT-talc powder containing 50% DDT on 100 g. onion seed.

471. ANON. 635.31: 632.77
De aspergevlieg. **(The asparagus fly.)**
Vlugschr. PlZiekt. Dienst, Wageningen, **56**, 1947, pp. 4.

The life history of the asparagus fly (*Platyparaea poeciloptera* Schrk.) and the damage it causes are outlined and illustrated. Recommendations for control involve (1) ploughing up seriously infested fields to destroy all stems so that there is no source of infestation the next year; (2) cutting back infested stems before 15 June. Then before 15 August all infested stems should be cut out at a depth of at least 6 cm. and burnt on the spot. It is advisable also to cut out all stems to a depth of 6 cm. by 1 December and burn them.

472. FREZAL, P. 635.32
L'abâtardissement de l'artichaut. **(The degeneration of the globe artichoke.)**
(*Publ.*) *Service de la Protection des Végétaux, Dir. Agric., Algér.*, 1947, pp. 7.

The Algerian artichoke industry is faced with a shortage of healthy planting material. The remedy lies in the selection of healthy suckers in the nursery, inspection in spring before the last irrigation, and continued roguing. The symptoms of the so-called degeneration as seen in suckers are described and illustrated. The presence of affected plants in a plantation reduces earliness, yield and quality.

473. TIMOFEEV, N. N. 581.14: 635.34 + 635.52
The head quality and length of vegetative period in head-forming plants. [Russian.]
Proc. sci. Conf. Timirjazev agric. Acad. 1945, 1946, **3**: 69-73.

The relation between the quality of the head and the length of the growth period has been studied in cabbage and in cabbage lettuce. Data tabulated for cabbage show that the high quality late varieties have a higher ratio of number of lower leaves to number of upper leaves on the stem, than the early ripening plants, which are of poorer quality.

474. KNOTT, J. E., AND HANNA, G. C. 635.34: 581.14
The effect of widely divergent dates of planting on the heading behaviour of seven cabbage varieties.
Proc. Amer. Soc hort. Sci. for 1947, 1947, **49**: 299-303, bibl. 4.

It is found that, whereas some cabbage varieties are considerably influenced with regard to their tendency to bolt or form heads by the date of planting, others are little affected under Californian conditions.

475. HEINZE, P. H. 635.34: 631.535: 577.17
The use of growth-regulating substances in the propagation of cabbage from cuttings.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 309-14, bibl. 4.

It was found possible with the initial aid of naphthaleneacetic acid and indolebutyric acid to root cuttings from selected cabbage heads of the spring crop and keep them growing for seed production the following spring. Time was saved and handling facilitated by the use of the growth substances in dust form with fungicides as carriers, the most satisfactory rooting of dust-treated cuttings following the use of 0·10% to 0·15% naphthaleneacetic acid in Fermate.—Charleston, S.C.

476. POUND, G. S. 635.34: 632.8
Reactions of cabbage varieties to mosaic viruses.
J. agric. Res., 1947, **75**: 19-30, bibl. 13.

In a study of the relative susceptibility to mosaic viruses certain cabbage varieties showed a distinct gradient but fell roughly into three classes of susceptibility. The most susceptible group included three varieties which show only moderately severe symptoms until late season, when they break and show very severe effects of the disease.

477. ESSIG, E. O. 632.753: 635.34
Observations on aphid control by DDT vapor fog and water suspension spray.
Circ. Calif. agric. Exp. Stat. **365**, 1946, pp. 76-8.

Cabbage aphid, *Brevicoryne brassicae* Linn., proved to be mildly susceptible to DDT fog.

478. B., P. 635.34: 632.76
Lutte contre les charançons du chou. **(Control of the cabbage weevil.)**
Rev. romande Agric. Vitic., 1946, **2**: 31-2.

Cabbage and colza were seriously damaged in 1945 by the cabbage weevil (*Ceutorrhynchus quadridens*). Until that year little could be done to control it, for it had proved resistant to DDT. Hexachlorocyclohexane (HCC or Hexa), however, has given excellent results, as Maag 941, applied at 1% to 1½%. The treatments are equally good against the turnip gall weevil (*C. pleurostigma*) and the colza weevil (*C. napi*).

479. ULLYETT, G. C. 632.78: 635.34
Mortality factors in populations of *Plutella maculipennis* Curtis (Tineidae: Lep.), and their relation to the problem of control.
Ent. Mem. Union S. Afr. Dep. Agric., 1947, **2**: 77-202, bibl. 88.

A detailed account of mortality factors, e.g. weather, parasites and chemical control, and of cultural control measures advisable.

480. CLARK, P. J. 635.34: 632.951
D.D.T. residues on cabbages.
N.Z. J. Sci. Tech., 1947, **29**, Sec. A, pp. 1-4, bibl. 11.

It is concluded that with reasonable care it should be

possible to market cabbages which have been treated with DDT with a certainty that they will not contain more than 7 p.p.m. Where spray was used the residual DDT was not more than 2·5 p.p.m.—Dominion Laboratory, D.S.I.R., N.Z.

481. Wolf, B., and Ichisaka, V. 635.41: 631.8
Rapid chemical soil and plant tests.
Soil Sci., 1947, **64**: 227-44, bibl. 11.
Rapid tests for soluble nutrients in soils and in plants and for total nutrients in plants are described. By means of them the nutrition of autumn-grown spinach was studied; the data are tabulated.

482. Kuntz, J. E., and Walker, J. C. 632.8: 635.41
Virus inhibition by extracts of spinach.
Phytopathology, 1947, **37**: 561-79, bibl. 13.
Extracts of leaves of spinach, garden beet, sugar beet and chard inhibited the infectivity of the viruses of tobacco mosaic and cabbage mosaic, and the spinach extract had an inhibiting action on other plant viruses also.

483. Moore, H. I. 635.48
Farming in Yorkshire. [Rhubarb growing.]
J. Inst. Corn and agric. Merchants, 1947, **1**: 62-7, illus.
A popular article which includes an interesting note on the rhubarb industry centred in Leeds, which in 1939 grew over 3,700 acres out of the total of 7,200 acres grown in England and Wales. The rhubarb is forced in long, low, dark, heated sheds. The stocks, after growing in the open for two years, are lifted in the autumn and placed close together in the sheds with a sprinkling of soil between. Considerable skill is necessary in the regulation of moisture and heat in order to secure good sticks of a pleasing colour. Marketing begins at Christmas and continues till April. It is said that the smoke-laden atmosphere of the district causes rhubarb tops in the field to die down early in the autumn, thus enabling the stools to be lifted earlier than is usual elsewhere; hence the earliness of Leeds rhubarb.

484. Kassanis, B. 635.52: 632.8
Studies on dandelion yellow mosaic and other virus diseases of lettuce.
Ann. appl. Biol., 1947, **34**: 412-21, bibl. 8.
The symptoms caused by dandelion yellow mosaic virus on cultivated lettuce are described and compared with those caused by lettuce mosaic virus. Lettuce is much more susceptible than dandelion to the yellow mosaic disease. Lettuce mosaic virus was found in most samples of commercial seed, but no evidence was found of the seed-transmission of dandelion mosaic virus. Cucumber mosaic virus was isolated from naturally infected lettuce.—Rothamsted Experimental Station.

485. Sansom, C. H. 635.561
Cultivation of watercress.
Bull. Minist. Agric. Lond. **136**, 1947, pp. 25, bibl. 1, illus., 1s.
Few English streams provide the conditions necessary for successful cultivation of watercress and for this reason the crop is generally grown in specially constructed beds with controlled irrigation, the water usually being about 50° F. and commonly obtained from chalk beds often 300 ft. or so below the surface. Little scientific investigation has been devoted to the problems of watercress production in Britain so that present methods and knowledge are the result of a long process of trial and error. Mr. C. H. Sansom, who is mainly responsible for this bulletin, is a successful grower of 40 years experience and well qualified to write on the practical side of the subject which is introduced with a historical note and a general consideration of such subjects as site, labour supply, buildings and costs. The bulk of the bulletin is devoted to: details of methods used for constructing the beds; a short note on types and varieties of cress; full descriptions of planting operations and methods of cultivation; hints on harvesting and marketing; and brief notes on pests, luckily few in number. A useful calendar of operations to be carried out in the beds each month is given as an appendix. Good illustrations add to the value of this highly practical bulletin.

486. Hamence, J. H., and Taylor, G. 635.561: 632.19: 631.84
Nitrate deficiency in watercress.
Agriculture, 1947, **54**: 358-61.
An account of investigations, begun at Kew, into a failure of new watercress beds in Lincolnshire. It was established that the use of nitrate nitrogen applied as a steady and continuous water treatment throughout the whole growth-period of the cress resulted in the production of a profitable crop. The investigations provided substantial evidence that watercress can absorb the greater part, if not all, of the nitrate necessary for its growth by way of its floating rootlets. As the concentration of nitrate in the water falls from a high to a low, or negative figure, so the condition and growth of the cress declines in similar degree. The nitrate concentration of the treated water invariably becomes weaker as the water passes through the mass of growing cress so that the outlet water is often nearly or completely deficient in nitrate. [See *H.A.*, 8: 1096.]

487. Anon. 635.61
New sulphur resistant melon.
Market Grs J., 1947, **76**: 12: 5, 36.
The new V-1 muskmelon tolerates sulphur, which can be applied frequently enough to prevent mildew. It can apparently outgrow mosaic. The fruit is of good commercial quality, and the flesh firm enough for transport.

488. Simonneau, P. 635.61 +635.615(653)
La culture irriguée des melons et des pastèques en Oranie orientale. **(Growing melons and water melons under irrigation in eastern Oran.)**
Doc. Rens. agric. Algér. Bull. **132**, 1946, pp. 38.
In preparing the land, farmyard manure is buried below beds 1·50 m. wide running E.—W. In March seeds are soaked in water for 24 hours, then set in fresh manure for 12-24 hours; as soon as they begin to germinate, 5 seeds are sown at each stand, 50 cm. apart, at the southern edge of the bed. If farmyard manure is not available, a complete artificial manure is placed below each stand, at the side of the irrigation furrow. At each stand 2 plants are left, and when these bear 4 leaves the cotyledons are removed and the plants headed back to 2 leaves; later the two branches are headed back to 2-3 leaves for canteloupes, 8 for other melons. Later side branches are cut back to 2-3 leaves for canteloupes, or 2 leaves beyond the fruit for others; the canteloupe is allowed to mature 3 fruits, others from 4 to 6, per plant. The watermelon is not cut back. Irrigation water contains 0·50 to 2·50 g. NaCl per litre; the more sparing the use of saline water and the lighter the irrigation, the better the flavour of the fruit. Varieties, rotations, diseases and labour requirements are discussed.

489. Brasher, E. P. 635.61: 631.544.1
A successful method of utilizing glass plant protectors.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 287-95, bibl. 4.
A comparative experiment with so-called casserole or mixing bowl glass protectors of different types for the forcing of cantaloupes and water melons is described and results are discussed in some detail. In promoting earliness of production they were eminently successful.—Newark, Del.

490. Rahn, E. M. 635.61: 631.8
Yields of cantaloupes as affected by time of placement of manures in furrows.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 277-80, bibl. 1.

When horse manure and poultry manure (made with peanut litter) were placed in furrows 1 week, 1 month and 5 months before sowing cantaloupe seed, the greatest total and early marketable yields resulted from the 1 month interval, whilst the greatest jumbo melon yields resulted from the 1 week time interval.—Newark, Del.

491. DOLAN, D. 635.61: 632.4
A new anthracnose on melons.
Phytopathology, 1947, **37**: 583-96.
A new anthracnose disease of muskmelon and watermelon appears as small pink to light brown spots which coalesce to form long streaks on the petioles and vines, rarely on laminae or cotyledons. The leaves wither mostly as a result of petiole infection. The disease is caused by *Marssonina melonis* n.sp., which is described. In tests the muskmelons Conomon, White melon and Freeman cucumber showed definite resistance, which is dominant in F_1 progenies. The Honey Cream watermelon is much more resistant than other watermelons tested.

492. DARPOUX, H. 635.61: 632.4
La cladosporiose des melons. (**Cladosporium disease of melons.**)
Rev. hort. Paris, 1946, **118**: 187 [received 1947].
Cladosporium cucumerinum can be controlled in the melon house by disinfecting beds, etc., with 2% formalin, and by spraying the plants with 1% bordeaux mixture.

493. MURAYAMA, S. J. 635.61: 632.753
Pulgões e melanciais. (**Aphids and melons.**)
Rev. agric. São Paulo, 1947, **22**: 273-6.
The failure of the melon crop in São Paulo is attributed to (1) excessive organic manure, (2) the use of unselected seed and (3) lack of control of pests and diseases. Aphids may be controlled by regular spraying with nicotine sulphate or an infusion of tobacco. Artificial manures should be added to balance the organic manures generally used.

494. ROBERTS, R. 632.765: 635.61
Soil treatment to control *Blapstinus* wireworms.
J. econ. Ent., 1947, **40**: 571-2.
Both benzene hexachloride and DDT when mixed with soil were found capable of killing wireworm larvae feeding on roots of cantaloupe and other annuals.—Experiment Station, Weslaco, Texas.

495. BROWN, H. D., AND ALBAN, E. K. 635.61/62: 632.951
Susceptibility of some of the cucurbits to DDT injury.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 320-4.
All the 42 varieties of cucurbit, including squashes, pumpkins, musk- and water-melons were damaged in varying degrees by DDT spraying.—Columbus, Ohio.

496. WALTON, R. R. 632.951: 635.62
Effects of chlorinated hydrocarbons and sabadilla on insects and plants.
J. econ. Ent., 1947, **40**: 389-95, bibl. 3.
DDT, benzene hexachloride {666], chlordane and sabadilla were initially equally effective against the squash bug, *Anasa tristis*, but sabadilla was less persistent. Sabadilla was less toxic to the spotted and to the striped cucumber beetle, *Diabrotica duodecempunctata* and *D. vittata*, than were the other insecticides. White bush, Yellow Crookneck, and Acorn varieties of squash were stunted by early treatment with DDT and benzene hexachloride, but they recovered later. Sugar pumpkins were not affected by treatment at 7 weeks.—Oklahoma Agric. Exp. Stat.

497. BARNES, W. C. 635.63: 631.523
Cucumber breeding methods.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 227-30, bibl. 2.
Fully discusses technique used and materials necessary.

498. MUSIÏKO, A. S. 581.162.3: 635.63
Supplementary artificial pollination of crops. [Russian.]
(*Publ.*) *Lenin Acad. Agric. Sci.*, Moscow, 1941, 18 pp [received 1947].
Discusses the advantages derived from the artificial pollination of a number of field crops and also of cucumbers and vines. Hand pollination in cucumber using a small brush with a wad of cotton wool at the end will increase the crop by 30-35%.

499. MCCRORY, S. A. 635.64
Four essentials for a good tomato crop.
Circ. S. Dak. agric. Exp. Stat. **62**, 1946, pp. 4.
Use suitable varieties. Use fertile soil in seed boxes. Transplant when 6 to 8 weeks old. Use starter solution at time of transplanting.

500. QUINN, N. R. 635.64
Out-door tomato culture.
J. Dep. Agric. S. Aust., 1947, **51**: 56-64.
An illustrated account of the operations involved in successful outdoor culture of tomatoes in South Australia, with advice on soils, seed, propagation, manuring, preparing the soil and transplanting, staking, pruning, irrigation, cultivation and harvesting. A list is appended of varieties suitable for cultivation in South Australia (1) as unpruned bushes, (2) staked and pruned, tall and medium. The advice given includes notes on a method of " crowning up " tomato rows for furrow irrigation, planting up being done on the lee side of the banks formed by furrowing, and of the use of 4 gal. cans to protect young plants from cold winds.

501. ROODENBURG, J. W. M. 635.64: 581.145.1
Groei en bloei van de tomaat. (**The growth and flowering of the tomato.**) [English summary ½ p.]
Meded. Direct. Tuinb., 1947, **10**: 296-306, bibl. 14.
The importance of a study of the physiology of plants is discussed in relation to methods of cultivation, particularly with reference to temperature and moisture in tomato culture. The findings of Went that artificial illumination during the night has the same result as a high night temperature is unconfirmed by experiments at Wageningen. The successful germination of tomato seeds is dependent on temperature changes. The place where the first truss is formed depends on temperature and light supply (CO_2 assimilation). When the temperature is low a truss appears immediately after the production of the minimum number of leaves necessary for truss formation. The discovery of Zimmerman and Hitchcock (see *H.A.*, 13: 365) that 2-3-5 triiodobenzoic acid may modify the formation of trusses was confirmed by the writer and his colleague. This substance acts as a hormone, suppresses vegetative development and causes trusses to develop in unusual places, in the axils of the leaves or at the top of the stem.

502. IPATJEV, A. N., AND GAENKO, A. V. 635.64: 581.14
An analysis of earliness in tomatoes. [Russian.]
Proc. Kirov Agric. Inst. Omsk, 1939, Vol. **4** (17), pp. 127-31 [received 1947].
Reddening of the fruit may be premature and is not a reliable sign by which to recognize inherent earliness. Other more reliable characteristics are discussed.

503. WALKER, W. F. 635.64(946)
Description of tomato varieties under trial in Tasmania.
Tasm. J. agric., 1947, **18**: 141-8.
The varieties described (about 100) are some of many which have been tested over the last eight years. Only 16 of these, named, can be recommended for Tasmanian conditions.

504. MEUNISSIER, E. 635.64
Les tomates. **(Tomatoes.)**
Rev. hort. Paris, 1946, **118**: 136-40 [received 1947].
A description of the characteristics, adaptability and origin of tomato varieties grown in France.

505. EŽOV, V. A., AND OŠEV, A. 635.64: 631.541
The Bogarn tomato. [Russian.]
Agrobiologija, 1946, No. 3, pp. 149-50.
A tomato variety derived from a vegetative hybrid resulting from the third successive grafting of the variety Bison on black nightshade (*Solanum nigrum*) is described. This new variety under the name Bogarn 71 can be grown in dry regions without irrigation and shows resistance to frost and to tip rot. Grafted on to Bulgarian pepper it has yielded another vegetative hybrid which has been named Pobeda.

506. DOESBURG, J. J. 635.64: 577.16
De verdeling van het vitamine C-gehalte over de verschillende delen der tomatenvrucht. **(The distribution of vitamin C content over the several parts of the tomato.)** [English summary ½ p.]
Meded. Direct. Tuinb., 1947, **10**: 342-9, bibl. 6.
The data of the results obtained for 8 varieties of tomato grown under glass are given in four tables. The skin of the fruit is richest in vitamin C and therefore is the most important part of the fruit for the canning industry. The cultivation of varieties with a high ascorbic-acid content and a thick wall, seems to be of great importance. The ascorbic-acid content increases with increasing quantity of light. Fruits picked late have a higher content than those picked early.

507. TOTMAKOV, G. V. 635.64: 631.523
Heterosis in tomatoes. [Russian.]
Vernalization and plant breeding, pp. 57-93, being a collection of dissertations published by Lenin Acad. agric. Sci. Moscow, 1937, pp. 184 [received 1947].
Detailed observations are recorded for a large number of tomato crosses. The general conclusion reached is that, on the whole, heterozygous tomato plants develop and yield better than either of the parent plants.

508. GLUŠČENKO, I. E. 635.64: 631.541
Experimental data on hybridizing tomatoes by grafting. [Russian.]
Agrobiologija, 1946, No. 3, pp. 78-105, bibl. 11.
After an introductory review on graft hybrids in general, data are presented which show that in grafting tomatoes the characters of the vegetative hybrids are influenced by those of the two components of the graft. Between sexual and vegetation hybridization there are similarities in that characters derived from the two components are inherited by the progeny. There are, however, differences, for in graft hybrids segregation shows in the first generation. Biochemical investigations show that in some cases valuable qualities can be enhanced in the vegetative hybrids. Thus in one of these hybrids the fruit of the progeny (from seed) contained more ascorbic acid than either of the component varieties.

509. IVANČENKO, P. L. 635.64: 575.257: 633.491: 581.192
Modifying the economically useful characters of vegetable crops by means of grafting. [Russian.]
Agrobiologija, 1946, No. 3, pp. 143-5.
Potato and tomato varieties were grafted on stocks of different potato varieties. Earliana and Mikado tomatoes, for example, were grafted on Early Rose and Stakanov 3593 potato varieties respectively; and Humbert San Morgano, Golden Queen, Earliana, Early Rose, and Mikado were used both as scion and stock, grafted on one another. The general conclusion reached was that tomato plants grown from seed produced by the scions on potato stocks, and potato tubers formed on stocks on which potato and tomato scions had been grafted, can be improved by grafting, the content of sugar and dry matter having been increased in many of the progeny described. Grafting also modified the shape and colour of fruit, and the shape of leaves.

510. BAZAVLUK, V. JA. 635.64: 631.541
The colour of the fruit of vegetative hybrids. [Russian.]
Agrobiologija, 1946, No. 3, pp. 106-14.
A microscopical investigation of the cell contents of tissues involved in the colour of the fruit of tomato vegetative hybrids and of the component varieties.

511. THOMAS, H. R., AND MOORE, W. D. 635.64
Influence of the length and manner of storage of tomato seedlings on stand, early growth and yield.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 264-6, bibl. 1.
Tomato seedlings sent from Tifton, Ga, to Lafayette, Ind., in moist peat in hampers were on arrival submitted to various delays in planting. In total yield there was no significant difference between treatments but early yield was significantly reduced by keeping more than 3 days without planting.

512. LAWRENCE, W. J. C. 635.64
Better glasshouse crops—No. 5.
Grower, 1948, **29**: 20-3.
Yields of English glasshouse tomatoes could be increased considerably by: using the right kind of compost, picking-out seedlings early, transplanting once only and feeding correctly. How to do so is here set out.

513. STRONG, M. C. 577.17: 635.64
Tests of the hormone stilboestrol as an aid in greenhouse tomato production.
Quart. Bull. Mich. agric. Exp. Stat., 1947, **30**: 51-3, bibl. 4.
Although stilboestrol seems to have no deforming effects on tomato foliage or fruit, it is not so effective in inducing fruit set or increasing size of fruit as beta naphthoxyacetic acid or 2,4-dichlorophenoxyacetic acid which have been previously tested and are now being used commercially in greenhouse production. [Author's summary.]

514. VAN KOOT, Y. 635.64: 577.17
Proefnemingen met groeistoffen ter verkrijging van een betere vruchtzetting bij tomaten. **(Experiments with hormone sprays in order to obtain better fruit-setting with tomatoes.)** [English summary ½ p.]
Meded. Direct. Tuinb., 1947, **10**: 165-81.
Spraying tomato flowers with hormone sprays may result in parthenocarpy; under unfavourable growing conditions fruit-setting can be improved, ripening is accelerated, and the fruits develop more vigorously. Excessive spraying, however, is harmful. It is advisable to spray the first two trusses at least once a week, as soon as blossoming begins, and each of the following trusses once only, as soon as almost all flowers of that particular truss are open.

515. IVERSON, V. E. 635.64: 631.8
Effects of skim milk on the growth and yields of tomatoes. (Preliminary report.)
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 263, bibl. 1.
Preliminary small scale experiments at Bozeman, Mont., resulted on the average in a 40% increase in early and 49% increase in total yield of tomatoes following the application of 150 c.c. skim milk per plant over a period of 5 weeks.

516. Hester, J. B., Smith, G. E., and Shelton, F. A. 546.46: 635.64+633.492
The relation of rainfall, soil type and replaceable magnesium to deficiency symptoms.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 304-8, bibl. 10.

Magnesium deficiency was prevalent in New Jersey in tomato and sweet potato fields in 1946. The deficiency was observed on sandy soils that had less than 100 pounds of replaceable magnesium per acre and did not occur on those that averaged 132 or more pounds per acre. Magnesium sulfate, at the rate of 200 pounds per acre prevented the deficiency from developing even after it became prevalent in the field. All soils analysing low in magnesium should be limed with a dolomitic liming material or have approximately 2 per cent. of available magnesium in the commercial fertilizer mixture. [Authors' summary.]

517. Frazier, W. A., and Bowers, J. L. 635.64: 632.19
A final report on studies of tomato fruit cracking in Maryland.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 241-55, bibl. 17.

Detailed observations are recorded on the incidence of cracking on a number of tomato varieties at Beltsville, Md. The conclusion is reached that "since varietal differences in cracking do occur, and since climatic factors conducive to cracking may often be difficult to control under field conditions, breeding for resistance is logical. A brief discussion of the breeding problem is given.

518. Selman, I. W. 635.64: 632.8
Resistance to mosaic infection in the tomato in relation to soil conditions.
J. Pomol., 1947, **23**: 71-9, bibl. 9.

It is concluded that soil conditions are related to resistance of the plant to mosaic infection. Of the many interrelated factors involved, there is evidence that under nursery conditions on a fertile soil, the soil water supply and the supply of concentrated fertilizers may be of some importance in this connexion. [From author's summary.]—Exp. Res. Stat., Cheshunt, Herts.

519. Zabala, S., and Delle Coste, A. C. 632.8: 633.71: 635.64: 633.842
La presencia del mosaico comun del tabaco en los cultivos de pimiento y tomate. (**Common tobacco mosaic on capsicum and tomato.**)
Publ. Inst. Sanid. veg. B. Aires **28**, Ser. A, 1947, 8 pp., bibl. 5.

Preliminary observations indicate that common tobacco mosaic and several strains of the same virus are present in the capsicum and tomato plantations in the horticultural zones of the Argentine republic.

520. Gardner, M. W., and Michelbacher, A. E. 635.64: 632.73
Controlling thrips and tomato spotted wilt with DDT.
Circ. Calif. agric. Exp. Stat. **365**, 1946, pp. 35-8.

Spraying with DDT was more effective than nicotine fumigation. An application to the empty glasshouse, just prior to planting, appeared to be especially effective.

521. Schroeder, W. T. 635.64: 632.952
Control of tomato diseases by spraying.
Bull. N. York State agric. Exp. Stat. **724**, 1947, 28 pp., bibl. 9.

Satisfactory control of the three major diseases of tomato, early blight, late blight and anthracnose, was obtained only when Fermate or Zerlate was used in various alternate schedules with copper fungicides; the same treatment controlled leaf mould also. The results indicated that the Zerlate-bordeaux schedule in the order of application of Zerlate-Zerlate-bordeaux-Zerlate-bordeaux, using bordeaux 8-4-100 and Zerlate 2 lb. to 100 gal., was superior to any other combination tested.

522. Watts, V. M. 635.64: 632.651.3
The use of *Lycopersicon peruvianum* as a source of nematode resistance in tomatoes.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 233-4, bibl. 6.

Results since 1944 at Fayetteville, Ark., indicate very strongly that varieties can be developed which will combine a high degree of nematode resistance with other characters considered desirable in tomatoes.

523. Harrison, A. L. 635.64: 632.411
The relation of weather to epiphytotics of late blight on tomatoes.
Phytopathology, 1947, **37**: 533-8, bibl. 10.

A severe outbreak of late blight, *Phytophthora infestans*, is reported on tomato seedlings in seed beds in Florida. Rainfall was not so important in the spread and development of late blight as were long periods of high humidity. The disease was comparatively slight unless the relative humidity was 100% for more than 15 hours. There is evidence that the fungal spores were carried 30 or more miles during certain periods when the weather was favourable for their development and dispersal.

524. Harrison, A. L. 635.64: 632.411
The control of late blight in tomato seed-beds under epiphytotic conditions.
Phytopathology, 1947, **37**: 625-34.

Late blight (*Phytophthora infestans*) appeared suddenly and destructively in tomato seed-beds along the west coast of Florida in January 1947, and experiments were carried out in attempts at control. Dithane (disodium ethylene bisdithiocarbamate)-zinc sulphate-lime spray gave consistently good control. Phygon (2,3-dichloro 1,4-naphthoquinone) in one test also gave good control. None of the copper sprays used was equal to those materials.—Florida agric. Exp. Sta.

525. Doolittle, S. P., and Haskell, R. J. 635.64: 632.411
Late blight of tomatoes.
A.I.S. U.S. Dep. Agric. **63**, 1947, pp. 6.

A description of the disease symptoms on leaves, stems and fruit, the conditions under which the disease spreads, and control measures. Recommendations are discussed under rotation, the use of disease-free plants, spacing, spraying and dusting (copper preparations chiefly).

526. Anon. 635.64: 632.95
Spray residues on tomatoes. Acid dip method of removal.
Agric. Gaz. N.S.W., 1947, **58**: 409-10, 416.

The acid dip is made up at the rate of 1 gal. commercial hydrochloric acid (muriatic acid) to 100 gal. water. A case of tomatoes is placed in the dip and kept gently moving up and down for 1 to 1½ min., by which time the spray residues should be removed. The case is then drained. Next it is placed in a lime bath (1 lb. lime to 40 gal. water) where it remains for about 1 minute before draining again. If desired, the tomatoes may receive a final rinse in water. After a final draining they are dried before packing.

527. Konkright, B. J., and Lange, W. H., Jr. 635.64: 632.76
Control of darkling ground beetles on tomatoes.
Circ. Calif. agric. Exp. Stat. **365**, 1946, pp. 33-4.

Small darkling ground beetles, particularly *Blapstinus* spp. and *Metoponium abnorme* (Lec.), often damage tomato transplants by feeding on the stems at ground level. The trials described showed that hydrated lime and 3% DDT were very effective in protecting the plants, but that calcium arsenate dust and baits offered little or no protection.

528. Floyd, E. H. 635.64: 632.78
Control of the tomato fruitworm in 1946.
J. econ. Ent., 1947, **40**: 422-3.
When dusted weekly on the developing fruits of autumn tomatoes, DDT and cryolite each gave excellent control of the tomato fruitworm, *Heliothis armigera*. Calcium arsenate and chlordane were less effective.—Louisiana Agric. Exp. Stat.

529. van Wezer, A. 635.65: 631.544
Late boontjes onder glas. **(Late beans under glass.)**
Cultuur Hand., 1947, **13**: 6: 16-17.
Beans are recommended as a late crop for growing under glass in the Low Countries after an early crop of tomatoes. Details are given for methods to be adopted (*a*) when the greenhouse becomes free at the end of July or beginning of August, (*b*) when it is free after the middle of August.

530. Loo, T. Y., and Chen, S. M. 635.65: 577.16
Effect of some mineral elements on the vitamin C content of bean sprouts. [Chinese.]
J. Agric. Ass. China, Suppl. No. 50. Abstracts of papers, 25th Annual Meeting, 1945, p. 21.
Beans were germinated in the presence of 46 inorganic salts representing 23 elements. Uranium, magnesium, and zinc were found to enhance the content and the physiological activity of vitamin C in the sprouts.

531. Zaumeyer, W. J., and Thomas, H. R. 635.651: 632.8
Saving beans from mosaic.
A.I.S. U.S. Dep. Agric. **61**, 1947, pp. 5.
This illustrated folder leaflet describes the common bean mosaic and the yellow bean mosaic. Their control involves the use of resistant varieties, roguing, and plant sanitation. Varieties resistant to common bean mosaic are named, but no variety resistant to yellow bean mosaic has yet been raised. In sections where yellow bean mosaic is prevalent, other hosts of the virus (sweet clover, crimson clover, red clover and gladiolus) should be kept at some distance from the bean plots.

532. Thomas, H. R., and Zaumeyer, W. J. 635.651: 632.3
Saving beans from bacterial blight.
A.I.S. U.S. Dep. Agric. **62**, 1947, pp. 5.
Three bacterial diseases of beans, common blight, halo blight and wilt, are concisely described. Control measures are discussed under the use of disease-free seed, rotation, staying out of the fields when the plants are wet, the use of disease-resistant varieties, seed treatment, spraying and dusting. Results in trials so far have been inconclusive.

533. Roll-Hansen, J. 632.4: 635.65
Soppsykdommer på bønne og ert. **(Fungus diseases of beans and peas.)**
Flygeskr. Statens plantepat. Inst., Oslo, **10**, 2nd edition, 1946, pp. 4 [received 1947].
Ascochyta hortensis and *A. pisi* are very common in Norwegian bean and pea crops respectively. Other diseases discussed include anthracnose of beans and some minor diseases.

534. Jauch, C. 635.65: 632.481
La "mancha chocolate" de las habas. **(Chocolate spot of beans [*Botrytis* sp.].)**
Rev. Invest. agric. B. Aires, 1947, **1**: 65-80, bibl. 21.
In the neighbourhood of Buenos Aires chocolate spot of broad beans is only severe after flowering when the relative humidity is high or during wet weather; it can then be controlled by regular spraying with 1% bordeaux mixture.

535. Miller, L. W. 635.65: 632.73
Populations of *Thrips tabaci* Lind. on bean varieties.
J. Aust. Inst. agric. Sci., 1947, **13**: 141-2, bibl. 5.
A study of the thrips population on 15 bean varieties growing in adjacent rows, each variety being replicated 2 or 3 times. There is no indication from the results that the thrips population were confined to any particular zone of the plant, but there are marked differences between the population on the various varieties, that on New Discovery being significantly less than that on any other variety. The character governing resistance appears to be similar to that in onions where thrips populations have been found greatest in varieties having leaf blades closely appressed, so protecting the thrips.—Dept. of Agric., Tasmania.

536. Lange, W. H., Jr. 635.65: 632.73
Preliminary experiments testing DDT and other materials for control of onion thrips on pink beans in the Sutter Basin.
Circ. Calif. agric. Exp. Stat. **365**, 1946, pp. 48-51.
The results indicate that a 3% or 4% DDT dust, preferably with sulphur in order to effect partial control of red spiders, is a satisfactory substitute for a tartar emetic spray against thrips. Growers are warned that DDT should not be applied to beans where the straw is to be fed to livestock.

537. Behr, L. 635.65: 632.77
Die Wurzelfliege *Hylemyia radicum* L. an Buschbohne. **(The fly *Hylemyia radicum* L. on French beans.)**
Festschr. O. Appel, biol. Zentralanst. Land-u. Forstwirtsch., Berlin-Dahlem, 1947, pp. 54-5, bibl. 23.
An account of damage done to French bean seedlings by larvae of the fly, *Hylemyia radicum*, feeding in the interior of the hypocotyl.—Biol. Zentralanst. Aschersleben.

538. McKelvey, J. J., Jr., Cuevara, J., and Cortés, A. 635.65: 632.76
***Apion* pod weevil: a pest of beans in Mexico.**
J. econ. Ent., 1947, **40**: 476-9, bibl. 6.
The pod weevil, *Apion* sp., attacks *Phaseolus vulgaris* and several wild leguminous plants in Mexico. DDT and hexachlorocyclohexane, applied first at the time of flowering and repeated if necessary, controlled this pest effectively.

539. Wester, F. E., and Marth, P. C. 635.653: 577.17
Effect of some growth regulators on yield of bush lima beans.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 315-9, bibl. 4.
In trials at Beltsville, Md, α-naphthaleneacetic acid at different concentrations and with and without the addition of boron had no significant effect on lima bean yields.

540. Cunningham, H. S. 635.653: 632.411.4
Control of downy mildew of lima beans on Long Island.
Bull. N. York State agric. Exp. Stat. **723**, 1947, 19 pp.
There was little difference in the efficiency of any of the copper sprays or dusts used in the experiments described; any one applied at weekly intervals will give good commercial control. Copper lime dust should be applied when the plants are wet. The organic materials used were of little value in controlling downy mildew.

541. Stubbs, L. L. 635.651: 632.8
A destructive vascular wilt virus disease of broad bean (*Vicia faba* L.) in Victoria.
J. Dep. Agric. Vict., 1947, **45**: 323-32, bibl. 13.
A vascular wilt disease of broad beans in Victoria is caused by a sap-transmissible virus, the characters of which suggest affinity with the tobacco ringspot virus. Comparative inoculations with the tomato spotted wilt virus showed differences between the two viruses.

542. SHIRLOW, N. S. 635.652
Richmond Wonder French bean. A new heavy-yielding, disease-resistant variety.
Agric. Gaz. N.S.W., 1947, **58**: 459.
This new variety, raised at Hawkesbury Agricultural College, is described. It combines disease resistance with heavy yields of long, straight, fleshy pods.

543. GALSTON, A. W. 577.17: 635.655
The effect of 2,3,5-triiodobenzoic acid on the growth and flowering of soybeans.
Amer. J. Bot., 1947, **34**: 356-60, bibl. 26.
2,3,5-triiodobenzoic acid does not induce vegetative soya bean plants to flower. It does augment the flowering response induced by photoperiod, possibly by antagonizing the effect of auxins.—Yale.

544. FORSBERG, J. L., AND BINKLEY, A. M. 635.656: 631.531.17 + 631.8
The effect of seed treatments, commercial fertilizers and minor elements on root rot, stand, and yield of pod peas.
Phytopathology, 1947, **37**: 650-6.
Pea seed treatment with New Improved Ceresan, Arasan, Spergon, Yellow Cuprocide, and Du Pont 1452-F generally resulted in increased stands. Combinations of fertilizers with seed treatments did not increase the effectiveness of the seed treatments. Addition of Cu, Fe, Zn, and Mn did not increase stands or yields. Effectiveness of seed treatment varied in different soils, against different fungi, and on different pea varieties. [Authors' summary.]—Colorado agric. Exp. Sta.

545. BANGA, O. 635.656: 631.55: 581.036
Het begrip warmtesom als kenmerk van doperwtenrassen. **(Temperature sums as a characteristic of varieties of peas.)** [English summary 6 lines.]
Meded. Direct. Tuinb., 1947, **10**: 198-201, bibl. 1.
The author criticizes Kopetz's conclusions (see *H.A.*, 14: 809) that the sum of the average day-temperatures from the beginning to the end of the vegetative stage, is a constant for pea varieties, provided that the development is not inhibited by too short a day length, and states that it can be proved from his own data that this does not hold good; there may be other limiting factors preventing temperature from having its full effect.

546. LANGE, W. H., Jr. 635.656: 632.753
Tests using DDT and other materials for control of the pea aphid.
Circ. Calif. agric. Exp. Stat. **365**, 1946, pp. 55-6.
A 4% DDT-sulphur dust was more effective in controlling pea aphid (*Microsiphum onobrachis*) on seed peas than a 2% DDT-sulphur mixture, a thiocyanate dust, or a nicotine dust. The use of sulphur with the DDT seems desirable, not only for controlling the aphid but also for checking mildew.

547. WARREN, G. F., AND BUCHHOLTZ, K. P. 635.656: 632.954
Weed control in cannery peas using dinitro sprays.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 347-50, bibl. 8.
In trials in Dodge County, Wisconsin, Dow Selective Weed Killer gave large and highly significant increases in yield of shelled peas as against untreated plots. Results with Sinox were not so good, owing apparently to greater injury sustained by the peas.

548. SMITH, L. M., AND LANGE, W. H., Jr. 635.656: 632.77
Experiments with DDT and lead arsenate for controlling the pea leaf miner and other pea insects.
Circ. Calif. agric. Exp. Stat. **365**, 1946, pp. 52-4.
Lead arsenate sulphur dust gave the best reduction in numbers of mines caused by *Liriomyza flaveola*, 5% DDT dust being next best. The results are preliminary and additional investigations will be required before DDT or other chemicals can be recommended for pea insect control.

549. LANGE, W. H., Jr., and SMITH, L. M. 635.656: 632.77
Control of a leaf miner on peas.
J. econ. Ent., 1947, **40**: 496-9, bibl. 2.
The pea leaf miner, *Liriomyza orbona*, attacking peas and spinach in California, can be controlled by dusts based on DDT or chlordane.—California Agricultural Experiment Station.

550. MINISTRY OF AGRICULTURE, LONDON. 635.8
Edible and poisonous fungi.
Bull. Minist. Agric. Lond. **23**, 1947, 63 pp., 5s.
This is a reprint, with some improved plates, of the sixth edition [see *H.A.*, 16: 963].

551. ANON. 635.8
New mushroom growing method.
Market Grs J., 1947, **76**: 12: 10, 40.
A new mushroom house is described. Hot water is forced through wrought iron pipes embedded in the concrete floor, which radiates heat; this is controlled by a thermostat. Walls are of cinder block and the roof is well insulated. The bottom bed, a buffer against the cold floor in houses heated in the usual way, is now the most productive.

Noted.

552.

a BEALE, H. P., AND LOJKIN, M. E. 633.71-2.8
A comparison of the infectivity of different preparations of tobacco-mosaic virus with their ability to precipitate specific serum antibody.
Contr. Boyce Thompson Inst., 1947, **14**: 457-69, bibl. 7.

b BONNER, J., AND GALSTON, A. W. 633.912/913: 581.192
The physiology and biochemistry of rubber formation in plants.
Bot. Rev., 1947, **13**: 543-96, bibl. 227.

c BROWN, H. D., AND OTHERS. 635.1/7(771): 631.531
Purity, germination, and yield of some vegetable seeds offered for retail sale in Ohio in 1941.
Bull. Ohio agric. Exp. Stat. **629**, 1942, pp. 29 [received 1947].

d CHAMBERLAIN, E. E. 635.64: 632.8
Tomato streak. Its incidence in New Zealand and identity with single virus streak (*Lycopersicum* virus 1 of Smith, 1937—a strain of tobacco-mosaic virus.
N.Z. J. Sci. Tech., 1946, **28**, Sec. A, pp. 225-33, bibl. 11.

e CHEN, C. Y., AND WANG, T. T. 635.65: 631.8
Fertilizers and composition of vegetables. [Chinese.]
J. Agric. Ass. China, Suppl. No. 50. Abstracts of papers, 25th Annual Meeting, 1945, p. 21.

f CHEN, C. Y. 635.65: 631.8
Fertilizers and the utilizable proteins in vegetables. [Chinese.]
J. Agric. Ass. China, Suppl. No. 50. Abstracts of papers, 25th Annual Meeting, 1945, p. 21.
Cabbage and Chinese cabbage.

g CHIN, T. C., AND YOUNGKEN, H. W. 633.88
The cytotaxonomy of *Rheum*.
Amer. J. Bot., 1947, **34**: 401-7, bibl. 21.

h CLORE, W. J., AND STANBERRY, C. O. 635.31: 631.8
Further results of asparagus fertilizer studies in irrigated Central Washington.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 296-8.

i Cox, J. A., Montelaro, J., and Woodward, R. S. 633.842
Bell pepper production in Louisiana.
Ext. Leafl. La agric. mechan. Coll. **7**, no date, pp. 3.

j Husås, Ø. 635.34: 632.77
Kålfluene. **(Cabbage flies [*Chortophila brassicae* and *C. floralis*].)**
Flygeskr. Statens plantepat. Inst., Oslo, **1**, 2nd edition, 1945, pp. 4 [received 1947].

k Jannaccone, A. 635.61
Risultati di un sessennio di lavoro per la selezione del popone invernale di Capua (var. *Palermitano*). **(Six years selection work on the Capua winter melon (var. *Palermitano*).)**
Ann. Fac. Agrar. Portici, 1942/43, Ser. 3, **14**: 176-83 [received 1947].

l Jørstad, I. 635.25: 632.4
Løkskimmel og gråskimmelråte på løk. **(Downy mildew and neck rot of onion.)**
Flygeskr. Statens plantepat. Inst., Oslo, **38**, 1945, pp. 4 [received 1947].

m Leggieri, L. 633.853.55
Razze di ricino sanguigno ottenute per selezione. **(Strains of castor oil plant (*Ricinus communis*) obtained by selection.)**
Ann. Fac. Agrar. Portici, 1943/46, Ser. 3, **15**: 175-86.

n Lorenz, O. A. 635.11
The effect of certain planting and harvest dates on the quality of table beets [at Davis, Calif.].
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 270-4, bibl. 3.

o Mai, W. F. 633.491-2.8
Virus X in the newer potato varieties and the transmission of this virus by the cutting knife.
Amer. Potato J., 1947, **24**: 341-51, bibl. 21.

p Martinez, A. 635.8: 632.4
Nota sobre un hongo invasor de los cultivos de *Agaricus campestris*. **(Note on a fungus invading beds of *Agaricus campestris*.)**
Rev. argent. Agron., 1947, **14**: 273-8, bibl. 6.

q Orlando, A., and Silberschmidt, K. 632.8: 633.71
Estudos sôbre a transmissão da doença de virus de solanáceas " necrose das nervuras ", por afídios, e algumas relações entre esse virus e o seu principal inseto-vetor. **(Studies on the transmission by aphids of " necrose das nervuras ", a virus disease of solanaceae and on some relations between this virus and its principal insect-vector.)** [English summary.]
Arq. Inst. biol., São Paulo, 1945, **16**: 133-52, bibl. 23 [received 1947].

r Paramonov, A. A. 635.262: 632.651.3
On the biology of the garlic stem nematode. [Russian.]
Proc. sci. Conf. Timirjazev agric. Acad. 1944, 1945, **2**: 94-6 [received 1947].

s Rose, F. J. 635.61: 631.544
Fruit under glass. II. Melons.
The fruit year book, 1947, R.H.S. Lond., No. 1, pp. 73-4.

t Schachman, H. K. 633.71-2.8
Viscosity studies on the association of tobacco mosaic virus.
J. Amer. chem. Soc., 1947, **69**: 1841-6, bibl. 25.

u Stapp, C. 633.491-2.3
Neuere Untersuchungen über die Resistenzverschiedenheiten deutscher Kartoffelsorten gegen *Bacterium phytophthorum* Appel. Vorläufige Mitteilung. **(Recent investigations into differences in resistance of German potato varieties to *Bacterium phytophthorum* Appel. Preliminary communication.)**
Festschr. O. Appel, biol. Zentralanst. Land-u. Forstwirtsch, Berlin-Dahlem, 1947, pp. 36-7, bibl. 4.

v Tiebout, G. L., and Montelaro, J. 635.262
Garlic as a truck crop.
Ext. Leafl. La agric. mech. Coll. **9**, revised 1947, pp. 4.

w Wei, T. C., and Chou, P. T. 635.64: 632.4 +632.8
Diseases of tomato in the vicinity of Chengtu. [Chinese.]
J. Agric. Ass. China, Suppl. No. 50. Abstracts of papers, 25th Annual Meeting, 1945, pp. 28-9. A list of 25 diseases of tomatoes in the vicinity of Chengtu is compiled in order of destructiveness.

x Woodward, R. S., Cox, J. A., and Montelaro, J. 635.615(763)
Watermelon production in Lousiana.
Ext. Circ. La agric. mech. Coll. **202**, revised 1947, pp. 5.

y Woodward, R. S., Cox, J. A., and Montelaro, J. 635.64
Tomatoes as a truck crop.
Ext. Leafl. La agric. mech. Coll. **10**, revised 1947, pp. 4.

z Wyllie, J. 633.491-1.16
Costs of production and financial results for potatoes, sugar beet, mangels and kale, 1939 to 1945.
Report Wye College, Dep. Econ., **40**, 1947, pp. 117-42, 2s.

FLORICULTURE.*

553. Oliver, R. W. 635.9(71)
Planning your garden.
Publ. Dep. Agric. Canada **795**, 1947, pp. 34, being *Fmrs' Bull.* **142**.
Preston, I., and Oliver, R. W.
Annual flowers for Canadian gardens.
Publ. Dep. Agric. Canada **796**, 1947, pp. 32, being *Fmrs' Bull.* **143**.
These two bulletins should be of the greatest possible help to all who are planning to lay out pleasure gardens for private houses in any part of Canada. Considerable attention is devoted to the selection of plants for particular sites. A space is left for vegetables in the plans, but they are not otherwise mentioned.

554. Clapp, R. 635.9(741)
Flower gardening in Maine.
Maine Ext. Bull. **363**, 1947, pp. 32.
This is of a purely practical nature and to the outsider it is mainly of interest as giving an account of sowing seed and raising seedlings in vermiculite.

555. Šipčinskiĭ, N. V. 635.9
Decorative planting in towns of the far north. [Russian.]
Priroda (Nature), 1947, No. 1, pp. 40-4.

* See also 14-22.

The main difficulties to be overcome are the short period of vegetation, the sharply fluctuating temperature during this period, lack of soils rich in humus and containing sufficient nitrogen, wet soils, and stony ground. After discussing how decorative planting can be accomplished despite these difficulties, the author gives three lists of plants suitable to the far north. The first contains 45 spp. representing the genera, *Alnus*, *Betula*, *Lonicera*, *Malus*, *Rosa*, *Salix*, *Sorbus*, *Picea*, *Pinus*, *Syringa*, and several others, which can be grown with little difficulty; the second contains 43 spp., and includes *Acer*, *Berberis*, *Clematis*, *Cotoneaster*, *Crataegus*, *Ribes*, and *Viburnum*, which require care and experience; and the third contains 18 herbaceous species for growing on rocks and scree.

556. HALLEMANS, A. 635.9: 632.4
Enkele ziekten van onze sierplanten. **(Some diseases of ornamental plants.)**
Cultuur Hand., 1947, **13**: 4: 32-3.
Notes on the symptoms and control of the following diseases: Twig blight of *Jasminum nudiflorum* (*Phoma jasmini*); shot hole disease of *Prunus laurocerasus* (*Coryneum laurocerasi*); poplar canker (*Dothichiza populea*); and violet rust (*Puccinia* sp.).

557. VANDERWALLE, M. R. 631.544
Note sur une affection des Sanseviera. **(A disease of ornamental sansevierias.)**
Parasitica, 1946, **2**: 83-5.
A leaf spot of ornamental Sansevierias under glass particularly *S. zeylanica* is described, caused by *Fusarium moniliforme* as a wound parasite. Control measures involve avoiding too moist atmosphere and the control of insects which puncture the leaves.

558. WITHROW, A. P., AND WITHROW, R. B. 631.544
Comparison of various lamp sources for increasing growth of greenhouse crops.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 363-6, bibl. 3.
Experiments were carried out with incandescent high and low watt lamps, fluorescent and mercury lights on spinach, asters, soybean and other plants in the greenhouse. For all crops except spinach, i.e. the warm temperature crops, the incandescent source gave as good or better general growth responses than the fluorescent or mercury sources. Work with 300-watt internal reflector flood lamps showed this to be an excellent incandescent source, no reflector being necessary. The necessity was emphasized in any such lighting installation for care in spacing the lamp mountings, so that wide fluctuations in irradiance do not occur across the bench or bed or down the length of the bench.—Lafayette, Ind.

559. LE GRAVEREND, E. 635.937.36
Le pois de senteur. **(Sweet peas.)**
Rev. hort. Paris, 1946, **118**: 168-9 [received 1947].
An account of improved varieties introduced between 1925 and 1940.

560. GOOD, H. M. 635.937.36: 632.4
Studies on the *Cladosporium* blight of sweet pea.
Canad. J. Res., 1947, **25**, Sec. C, pp. 137-54, bibl. 24.
Cladosporium album blight of sweet peas develops most rapidly at 25° C.; high humidity is necessary for infection, normally stomatal, and for fructification on the leaf.—Toronto.

561. LEMAIRE, P. 635.939.98
Amélioration dans la technique des cultures de chrysanthèmes. **(Improvements in chrysanthemum growing.)**
Jardins de France, 1947, **1**: 192-6.
Cuttings taken in the autumn should be started in an electric hot bed. Plants to provide single cut blooms should be planted in a 10 cm. pot and repotted into a 20 cm. pot. Liquid manure rich in nitrogen should be applied fortnightly in the summer and the pots should be watered every evening. Lime should be avoided, and rain water should be used if the water supply is hard. Stock plants should be grown in rotation and the soil sterilized by steam before replanting. By light treatment it is now possible to produce blooms from June until March.

562. POST, K. 639.939.98
Year-around chrysanthemum production.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 417-9, bibl. 6.
By the control of day length and using a minimum temperature of 60° F. flowering was induced in chrysanthemums in every month of 1946.

563. CHOUARD, P. 581.035: 635.939.98
Le photopériodisme. **(Photoperiodism [as affecting chrysanthemums].)**
Jardins de France, 1947, **1**: 108-11.
In an address to the French Chrysanthemum Society, Professor Chouard outlines the reaction of the chrysanthemum to length of day and temperature. To illustrate the chemical nature of the reaction, he cites floral induction in the Jerusalem artichoke, a short day plant, in midsummer, when grafted on the sunflower, a long day plant.

564. GIFFORD, V., AND KIPLINGER, D. C. 635.939.98
"Time pinching" chrysanthemums.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 387-91.
Trials have been made at Columbus, Ohio, of "time pinching" chrysanthemums. This is a new development whereby the plants are pinched according to the calendar, the later the date of maturity the later the pinch. An account is given of results of varying the time of pinching plants of different varieties raised from cuttings, potted up at different dates. Although very much remains to be discovered on the reasons for results, it appears that high quality can be procured in chrysanthemums by appropriate "time pinching". The planting and pinching schedule needs working out for each variety.

565. HOLUBINSKY, I. N. 581.162.3: 635.939.514
Contribution to the physiology of pollen germination. III. Influence of stigmas of *Petunia* upon pollen germination.
C.R. Acad. Sci. U.R.S.S., 1947, **55**: 763-6, bibl. 10.
Petunia violacea has marked stigmatic activity, the stigmas showing distinct stimulation not only to its own pollen but also to that of most other species tested. The stigmatic secretion is of limited duration and after being twice used for pollen germination the stigmas lose their ability to stimulate germination.

566. CHESNEL, G. 635.937.34
Les meilleures variétés de roses mises au commerce depuis 10 ans. **(The better roses introduced during the past 10 years.)**
Jardins de France, 1947, **1**: 13-17.
A description of the flowers of 54 varieties introduced into France since 1936.

567. RAY, S. H., AND SHANKS, J. B. 635.937.34 + 635.936.69
The aggregation and aeration of some greenhouse soil mixtures for roses and carnations.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 420-6, bibl. 6.
The effect of adding different organic and inert materials, of different methods of applying water, of different types of mulch, and of other treatments was studied at Columbus and notes are given here of the observations made.

568. Post, K. 639.937.34: 631.67
Copper tube surface automatic watering.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 395-404, bibl. 2.
The paper describes in detail the application of a method of automatic watering found practical by commercial rose growers in N. York State.

569. Ingram, C. 635.977.32
Two new varieties of the Indian cherry.
Gdnrs' Chron., 1947, **122**: 162.
A description of *Prunus cerasoides* var. *rubea*, the " Carmine cherry " collected by Kingdon Ward. *P. majestica* Koehne is here named as *P. cerasoides* var. *majestica* (Koehne) Ingram.

570. B., J. J. 634.23
***Prunus subhirtella* var. *autumnalis* Makino.**
Gdnrs' Chron., 1948, **123**: 13.
In England this Rose-bud cherry flowers profusely directly the leaves fall, and again early in spring; the semi-double pale pink flowers, scented like almond blossom, make the tree particularly remarkable in autumn. It may be propagated by seeds, cuttings, or by grafting.

571. S[tevens], R. A. G. 633.81
The cultivation of jasmine and preparation of the perfume.
Bull. imp. Inst. Lond., 1947, **45**: 17-23, bibl. 10.
An account of the industry as carried out in the communes around Grasse, France, where in normal times about 750 metric tons of blossoms were collected annually from *Jasmine grandiflorum*, grafted on *J. officinale* stocks. Some details are given of soil and climatic requirements, cultivation, yield, diseases and pests, preparation of perfume and costs of production.

572. Le Graverend, J. 635.974
Sur quelques Bignoniacées grimpantes de la Côte d'Azur. **(Some climbing bignonias of the Cote d'Azur.)**
Rev. hort. Paris, 1947, **119**: 325-6.
A list is given of the best bignonias for spring, summer, and autumn-winter flowering in the Cote d'Azur. Short notes are added on propagation and culture.

573. Thée, J. 635.977.6
A propos du Tipa. **(About the Tipa.)**
Rev. hort. Paris, 1947, **119**: 293-4, bibl. 2.
A note on a quick-growing, ornamental tree from Argentina introduced to Algiers in 1899 and now recommended for trial on the Cote d'Azur. Its numerous golden-yellow flowers recall those of the *Robinia*. It tolerates snow and a temperature of $-4°$ to $-6°$ C.

574. Wyman, D. 635.976(7)
Hedges for North America.*
Nat. hort. Mag., 1946, **25**: 207-26.
A most informative, well illustrated article on a subject which is yearly receiving more attention in Canada and U.S.A.

575. Barton, L. V., and Thornton, N. C. 635.976.84
Germination and sex population studies of *Ilex opaca* Ait.
Contr. Boyce Thompson Inst., 1947, **14**: 405-10, bibl. 3.
Seeds of American holly were separated into three sizes. Of the 12,000 seeds sown nearly half germinated after two or three winters. Of 1,255 seedlings planted out, a third had flowered when the experiment was abandoned; 64% produced staminate flowers, 36% pistillate. A lower proportion of the small seeds germinated, but seed size was without effect on sex ratio.

* See also *H.A.*, 16: 374.

576. Gould, C. J. 635.944: 632.4: 632.8
Narcissus diseases in Washington.
Bull. Wash. agric. Exp. Stat. **480**, 1946, 27 pp.
The symptoms and control measures recommended are given for basal rot, smoulder, fire, white mould, scorch, mosaic, decline and nematode disease. Several miscellaneous diseases are briefly described also.

577. Grove, L. C. 635.944
Growing the gladiolus.
Bull. Ia agric. Ext. Serv. **P85**, 1947, pp. 807-26, being revision of *Bull.* **P12**.
Every side of gladiolus cultivation in Iowa is rather briefly dealt with including storage of corms and pests and diseases.

578. Hudson, J. P. 635.944
Garden culture of the gladiolus.
N.Z. J. Agric., 1947, **75**: 301-14.
An illustrated account of the history, propagation, cultivation, diseases and pests of the gladiolus with notes on the treatment of the corms and of the cut flowers.

579. Krone, P. R., and Hamner, C. L. 635.944: 632.954
2,4-D treatment for the control of weeds in plantings of gladioli.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 370-8, bibl. 2.
Such treatment had no apparent effect on gladioli planted in soil 3 weeks after such treatment. Where, however, the treatment was given after the gladioli had been planted, there was definite retardation of growth in the earlier part of the season. Neither 2,4-D nor any other spray proved entirely satisfactory.

580. Wasscher, J. 635.944
Zaadteeltproeven met cyclamen. **(Seed-growing experiments with cyclamen.)**
Meded. Direct. Tuinb., 1947, **10**: 329-41.
The number of fruits set by cross-pollination was not greater than by self-pollination, but they contained more seeds. The results were not affected by rainy or cloudy weather. Although early set fruits ripen more quickly than later ones, they produce better seeds. High hot-house temperature (70° F.) is unfavourable for fruit-set, and for development and size of seed.

581. Bodmer, H. 635.944: 632.4
La pourriture des boutons floraux et des tiges des cyclamens. **(Rot of cyclamen flower buds and stalks.)**
Rev. hort. suisse, 1947, **20**: 314-5.
Although the cause of this rot is not known, it may be controlled by spraying with a 1% solution of Coprantol.

582. Senaratna, J. E. 635.944
Two new dahlias bred in Ceylon.
Ceylon J. Sci., 1947, **12**: 217-9, illus.
A brief history of the dahlia is given with a description of its flower-head and of hybridizing technique. Two new paeony-flowered hybrids named Fr. Le Goc and Ceylon Sunrise are described and illustrated.

583. Cayeux, L. 635.944: 632.4/8
Dégénérescence des variétés de dahlias, causes, remèdes, application pratique. **(Dahlia diseases, and their control.)**
Jardins de France, 1947, **1**: 71-80, bibl. 8.
Leaf spot, *Entyloma dahliae*, is not a serious disease of the dahlia. Bacterial diseases include collar rot, blight, and crown-gall. The most important virus disease also attacks tomatoes and cucumbers. These troubles may be reduced by the following measures: careful harvesting, maintaining an isolated stock bed, spraying or dusting cuttings, careful selection.

584. LIMASSET, P. 635.944: 632.8
Les maladies à virus du dahlia. **(Virus diseases of the dahlia.)**
Rev. hort. Paris, 1946, **118**: 11-14 [received 1947].
Dahlia mosaic is transmitted by the aphis *Myzus persicae*. Tomato spotted wilt may be transmitted to the dahlia by *Thrips* spp. A scheme is outlined for the maintenance of virus-free stocks, by regular fumigation and roguing.—Station Centrale de Pathologie Végétale, Versailles.

585. EMSWELLER, S. L. 635.944
The utilization of induced polyploidy in Easter lily breeding.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 379-84, bibl. 3.
A discussion of the possible advantages of tetraploid plants of *Lilium longiflorum* and other ornamentals.

586. HAUGE, A., BRYANT, W., AND LAURIE, A. 635.9: 631.564
Prepackaging of cut flowers.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 427-32, bibl. 3.
A summary of 2 years work at Columbus, Ohio, into the best methods of preparing and packing cut flowers, in particular roses, carnations and chrysanthemums. The most promising results have so far been obtained by packing in a cellophane enclosed container. The treatment of the different flowers is discussed in some detail.

Noted

587.

a BOURNE, A. I., AND SHAW, F. R. 635.939.872: 632.752
Control of black scale on gardenias in commercial greenhouses.
J. econ. Ent., 1947, **40**: 429-30.

b DESQUINEMARE, A. 635.944
Les dahlias. **(Dahlias.)**
Rev. hort. Paris, 1944, **116**: 122-3; 1945, **117**: 202-3, 218-19, 228-9, 310 [received 1947].

c GRANOVSKY, A. A. 635.944: 632.6/7
Summer-time control of gladiolus insects. Part I, Caterpillars, beetles, soil insects. Part II, Sucking insects. Part III, Gladiolus thrips.
Minn. Hort., 1947, **75**: 36-7, 59-60, 74-5, being *Pap. misc. J. Ser. Minn. agric. Exp. Stat.* **573** and **574.**

d KAMP, J. R., AND WEINARD, F. F.
Selection within a gardenia clon.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 385-6, bibl. 1.

e MANIGAULT, P., AND MARIAT, F. 631.544: 612.014.44
Progrès récents dans l'éclairement d'appoint pour les cultures en serre. **(Recent work on additional [fluorescent] lighting for greenhouse crops.)**
Rev. hort. Paris, 1946, **118**: 107-8, bibl. 2 [received 1947].

f POST, K., AND SCRIPTURE, P. F. 639.937.34: 631.67
Copper tube surface automatic watering.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 405-9, bibl. 8.

g POST, K., AND SEELEY, J. G. 635.937.34: 631.67
Automatic watering of roses 1943-1946.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 433-6, bibl. 1.

h POST, K., AND SEELEY, J. G. 635.937.34: 631.67
The constant water level method of watering roses.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 441-3, bibl. 3.

i WEINARD, F. F., AND KAMP, J. R. 635.937.34
Experiments in the handling of old rose plants.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 437-40, bibl. 3.
Cold storage not successful.

j YARWOOD, C. E. 635.939.516: 632.4
Snapdragon downy mildew [*Peronospora antirrhini*].
Hilgardia, 1947, **17**: 241-50, bibl. 19.

SUB-TROPICAL CROPS.

General.

588. EVERETT, P. 633.842 + 635.646 + 635.648
Culture of sub-tropical fruit in New Zealand.
N.Z. J. Agric., 1947, **75**: 263-4.
A plea for the extension of the cultivation of sub-tropical fruits in the warmer parts of the Auckland Province of New Zealand, more particularly along the east coast of the North Auckland Peninsula where there are many relatively small areas where frosts generally do not occur. Crops recommended and described include sweet pepper, egg fruit and okra.

589. OPPENHEIMER, C. 634.4/6(569.2)
The acclimatisation of new tropical and sub-tropical fruit trees in Palestine.
Bull. agric. Res. Stat. Rehovot **44**, 1947, pp. 184, bibl. 56, illus.
This revised publication, which first appeared, in Hebrew, in 1942, introduces readers abroad to the problems encountered in acclimatizing tropical and sub-tropical fruits in Palestine. The general principles of acclimatization, the basic factors of climate and soil and the recent history of acclimatization work in Palestine are presented in the three introductory chapters. The main part of the bulletin is devoted to the results of observations and experiments on the following fruits carried out over a period of 15 years: mango, avocado, persimmon, annonaceous fruits, myrtaceous fruits, loquat, papaya, passion fruit and minor fruits. A tentative forecast is made of the commercial possibilities of various fruits and an outline is given of some necessary research work. The publication is not intended as a textbook, but should be regarded as a progress report and a record of the present state of knowledge in Palestine.

590. MANGIN, H. 634.1/7
A.B.C. du planteur. **(The fruit planter's A.B.C.)**
Doc. Rens. agric. Algér., Bull. **131**, 1945 [?], pp. 15 [received 1947].
This guide covers all the practical details of planting deciduous and sub-tropical fruits. A table indicates the appropriate rootstock and spacing for irrigated land and for dry land with 300 mm. and 500 mm. rainfall. Only officially certified planting material of citrus should be used. The importance of planting improved material only is stressed.

Citrus.

591. ANON. 634.3
Variétés d'agrumes et commercialisation. **(Citrus varieties of commerce.)**
Fruits et Prim., 1947, **17**: 318-22.
Four tables from the Technical Report of the North African Commission for the study of Citrus Varieties, 1941, published in *Fruits et Primeurs*, February 1942. These tables, intended as an aid to the rapid identification of oranges, are headed: I. classification of the commercial orange varieties,

II. fruit characters of the principal orange varieties grown in North Africa, III. fruit characters serving as a basis for verifying varieties, and IV. a key for the identification of North African oranges.

592. HARDING, P. L. 634.3
Quality in citrus fruits: seasonal changes in relation to consumer acceptance of oranges, grapefruit, temple oranges, and tangerines.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 107-15, bibl. 5.
Standards of quality were determined at the U.S. Dep. Agric. Horticultural Field Lab., Orlando, Fla, for a number of citrus fruits based on chemical analysis and taste testing. Statistical studies showed that the palatability ratings were quite satisfactory for measuring quality. The quality of the different fruits which might be expected at different times is noted. Taste judges were found to demand sweeter and more mature fruit than that which would pass State maturity requirements.

593. MONSELISE, S. P. 634.3: 581.144
The growth of citrus roots and shoots under different cultural conditions.
Palestine J. Bot. (*R*), 1947, **6**: 43-54, bibl. 20.
An investigation into the annual cycle of growth of citrus shoots and roots under different pruning and manurial treatments as applied for the rejuvenation of neglected orchards. Edaphic factors limiting root growth and the relation between shoot and root growth are discussed.

594. HODGSON, R. W. 634.3
Citrus fruit quality problems of California and Florida.
Calif. Citrogr., 1947, **33**: 48, 62-6, bibl. 1.
An analysis of the principal factors affecting quality which supports the general conclusion that climate is the paramount factor. The practical problem is to utilize every means for improving quality within the limits imposed by climate. A plea is made for more breeding work aimed at finding or developing better rootstocks.

595. HALMA, F. F. 634.334-1.541.11
Own-rooted and budded lemon trees.
Calif. Citrogr., 1947, **33**: 2-3, 14-15, bibl. 3, illus.
Eureka lemons on their own roots, after 16 years, proved to be less vigorous, less hardy, and less productive than [vegetative] progenies of the same parents budded on grapefruit and sweet orange rootstocks. [Author's summary.]

596. MENEGHINI, M. 634.3-1.541
Enxertias de "seedlings" de citrus para fins experimentais. **(Grafting of citrus for experimental use.)**
O. Biológico, 1946, **12**: 282-4, bibl. 3.
To provide compact grafted material for use in investigating the tristeza disease of citrus the following technique was used. Seedlings 2-3 months old, bearing cotyledons and sometimes one or two leaves, were severed below the cotyledons, using a Gillette razor blade set at 45° to the horizontal. Stock and scion were then slit vertically through a diameter of the stem to a depth of about 1 cm.; this was marked on the razor blade to facilitate fitting the two parts. Half of each cut stem was then removed by a 45° cut. The scion was placed on the stock and the two held together by 3 or 4 simple knots; as the stem diameter was only 1 to 2 mm., the usual raffia binding was not feasible. The grafts were kept in a cool, humid place until they united. Nearly all the writer's grafts of *Citrus sinensis* varieties on bitter Seville rootstocks, some 600, were successful.—Instituto Biológico, São Paulo.

597. MCALPIN, D. M. 634.3-1.541.11
Citrus rootstocks in Victoria.
J. Dep. Agric. Vict., 1947, **45**: 365-70.
This article sets out the advantages and disadvantages of each of the main available rootstocks for the guidance of intending propagators and planters. The four chief rootstocks used in Victorian citriculture are citronella or rough lemon (*Citrus limon*), sweet orange (*C. sinensis*), sour orange (*C. aurantium*) and trifoliate orange (*Poncirus trifoliata*). A disease of certain varieties on sour orange rootstock, which has affected 30% of the trees in a rootstock trial, appears to be similar to the "quick decline disease" in U.S.A. and the "tristeza" disease in South America. There should be no further plantings of sweet orange and mandarin varieties and grapefruits on sour orange stock until the cause and remedy have been found. It is concluded that most growers will probably decide that their groves should be planted on several rootstocks, for each stock has certain advantages, and by the use of several types, natural disadvantages may be largely overcome.

598. HAAS, A. R. C. 634.3-1.85
Effects of fertilizer and rootstock on total phosphorus content of citrus flowers.
Soil Sci., 1947, **64**: 47-59, bibl. 5.
Attention is directed to the effects of fertilizers and rootstocks on the accumulation of phosphorus in citrus flowers. Changes in the phosphorus content of flowers as the flowering period advances are also pointed out, and "June drop" is considered. Flowers from Washington navel oranges on sweet orange rootstock had the highest phosphorus content when no nitrogen was applied to the soil or when only cover crops were turned under. There is a suggestion that a deficiency in the total sugar content together with excessive water loss may be factors involved in June drop of young orange fruits. The rootstock variety is important in relation to the total phosphate concentration of the dry matter of Eureka lemon flowers. The total phosphorus content of the dry matter of Valencia orange flowers was found to be largely dependent on the nature of the rootstock variety when factors such as scion variety and soil environment were the same.

599. ANON. 634.3-1.55
La cueillette et le ramassage des agrumes. **(The picking and collecting of citrus.)**
Fruits et Prim., 1947, **17**: 323.
A dimensioned sketch of a picking-bag fitted with a shoulder strap and a quick-opening bottom. Published before in *ibid.*, No. 91, November 1938.

600. STEWART, W. S., AND OTHERS. 634.31-1.55: 577.17
2,4-D sprays for control of navel orange drop.
Calif. Citrogr., 1947, **33**: 49, 77-9, bibl. 4.
A progress report on field trials. Reductions in fruit drop from 27% to 96% are reported using 2,4-D water sprays at concentrations of 5 p.p.m. to 25 p.p.m. of the free acid equivalent.

601. RANGEL, J. F., AND GOMES, J. G. 634.31-2.3/8
Guia para reconhecimento e combate das principais doenças e pragas da laranjeira. **(A guide to the identification and control of the chief diseases and pests of the orange.)**
Publ. Minist. Agric. Brazil, Dep. nac. Prod. veg., Div. Def. san. veg., **11**, 2nd edit., 1946, pp. 82, bibl. 53.
This revised and augmented edition follows the lines of the first [see *H.A.*, 9: 1349]. Fifty diseases and fifty-two pests are described, and control measures are given; there are twenty-seven formulae for the preparation of sprays and poisons and instructions for fumigation. Numerous coloured plates and other illustrations aid identification.

602. KLOTZ, L. J., STEWART, W. S., AND BUMGARDNER, R. J. 634.31-2.4
Rind spot and drop of Valencia oranges.
Calif. Citrogr., 1947, **33**: 36-7, bibl. 5, illus.
A consideration of the causes of rind spot in California and

the possibility of checking the drop of susceptible fruit by using 2,4-D spray.

603. Bliss, D. E. 634.3-2.4
Control of *Armillaria* root rot in citrus [in California].
Calif. Citrogr., 1947, **33**: 26-9.
Recommendations are made for treating trees already infected and for preventing the spread of the fungus.

604. Anon. 634.3-2.4
Collar rot of citrus.
J. Dep. Agric. Vict., 1947, **45**: 332.
Collar rot, or gummosis, of citrus trees in Victoria, is favoured by bad drainage, and proper drainage is an essential step in its control. Soil should not be heaped round the trunk and the tops of the main roots near the diseased area should be exposed. Cut away all dead tissue and apply a fungicidal paint. If trees are to be subsequently fumigated with hydrocyanic acid for scale insects the paste should consist of 1 lb. zinc sulphate, $\frac{1}{6}$ lb. copper sulphate, and 1 lb. of lime to 1 gal. of water. If there is to be no fumigation the paste should consist of 1 lb. copper sulphate, 2 lb. of water-slaked lime and 1 gal. of water.

605. Anon. 634.3-2.411
Phytophthora disease of citrus proclaimed under the N.S.W. plant diseases act.
Agric. Gaz. N.S.W., 1947, **58**: 417-9.
A penalty is now incurred by any person who knowingly sells or offers for sale citrus trees infected with any of the phases (collar rot, root rot or stem girdle) of the disease caused by *Phytophthora citrophthora* and other species of *Phytophthora*. The phases of the diseases are briefly described. All citrus varieties commonly grown are susceptible to infection, but the Eureka and Lisbon lemons are the most susceptible. Rough lemon rootstock shows some slight resistance, while trifoliate rootstock is immune. Precautionary measures for nurserymen are outlined.

606. Klotz, L. J. 634.334-2.3/4
Notes on lemon diseases.
Calif. Citrogr., 1948, **33**: 112-5, bibl. 4.
A short report of a recent discussion on four diseases: shell bark, dry bark, wood pocket, and lemon collapse.

607. Fawcett, H. S., and Calavan, E. C. 634.334-2.8
Wood pocket of lemons.
Calif. Citrogr., 1948, **33**: 94, 126, illus.
This disease was first noted in 1937 in 10-year-old trees of the semidense strain of Lisbon lemon growing at Riverside, California. Since then it has become serious in several orchards of the same strain. The symptoms and effects of the disease are described and an account given of transmission experiments. Further evidence is necessary to determine the exact nature of the disease which is suspected to be of virus origin. A warning is given against propagating this strain of lemon or using it as a rootstock.

608. Foote, F. J., and Gowans, K. D. 634.3-2.651.3
Citrus nematode.
Calif. Citrogr., 1947, **32**: 522-3, 540-1, bibl. 4, illus.
Citrus nematodes, *Tylenchulus semipenetrans*, are shown to be a serious handicap in orchards where they occur. The only known remedies are fumigation and replanting. The planting of an infested tree can cause the soil to become heavily infested in 10 years' time. In small test plots on old citrus soil fumigation resulted in a marked increase in the growth of lemon trees over those in untreated soil. There is a need for nematode-resistant citrus varieties and for a method of controlling the pest round growing trees.

609. DeBach, P. 634.3-2.654.2
Predators, DDT, and citrus red mite populations.
J. econ. Ent., 1947, **40**: 598-9, bibl. 3.
It is frequently stated that phytophagous mites increase after the application of DDT dust, because mite predators are reduced. Figures are given to show that this is the case with the citrus red mite.—University of California Citrus Experiment Station.

610. Hely, P. C. 634.3-2.654.2
The citrus bud mite (*Aceria sheldoni* Ewing).
Agric. Gaz. N.S.W., 1947, **58**: 471-6, 504, bibl. 8.
The citrus bud mite occurs throughout the citrus growing areas of New South Wales and is an important pest, especially of Navel oranges and lemons, in coastal orchards; it is of less importance on grapefruit and Silettas, while Valencias rarely show appreciable injury. It distorts twigs and deforms fruit. Distribution of the mites is largely related to the distribution of budded nursery trees; buds and twig grafts used in reworking trees to other varieties offer a ready means of initiating infestation. White oil and sulphur preparations are effective against bud mites, but the effects of the latter are more permanent. These materials are more effective than DDT emulsions or HCN fumigation. A system of "skeleton pruning" developed in the Gosford district to rejuvenate unproductive citrus trees is of special advantage in rehabilitating trees heavily infested with bud mite.

611. Chapot, H. 634.3-2.73
Un nouveau parasite des agrumes au Maroc.
(A new citrus parasite in Morocco, *Heliothrips haemorrhoidalis*).
Fruits d'outre Mer, 1947, **2**: 336-7, illus.
Recorded on citrus in Morocco for the first time in August 1947.

612. Metcalf, R. L. 632.73: 634.31
Relative toxicities of isomeric hexachlorocyclohexanes and related materials to thrips.
J. econ. Ent., 1947, **40**: 522-5, bibl. 11.
The chemicals were tested against the greenhouse thrips, *Heliothrips haemorrhoidalis*, on oranges. The gamma isomer of hexachlorocyclohexane was more toxic than other chemicals, and very much more toxic than the other isomers.—University of California Citrus Experiment Station, Riverside.

613. Dickson, R. C., and Lindgren, D. L. 634.3-2.752
The California red scale.
Calif. Citrogr., 1947, **32**: 524, 542-4, bibl. 3, illus.
This scale, *Aonidiella aurantii*, is the most serious citrus pest in southern California. At one time HCN fumigation was effective against it, but in the years immediately before 1914 a race developed which was resistant to HCN. This race has gradually increased and extended. Figures are given to show that while HCN-resistant red scales are more common in the interior than along the coast they occur in all areas and now constitute an important part of the red scale population.

614. DeBach, P., and Fleschner, C. A. 634.3-2.752
Biological control of the long tailed mealy bug.
Calif. Citrogr., 1947, **33**: 22-4.
A discussion on the biological control of *Pseudococcus longispinus* on citrus in California.

615. Plummer, C. C., and Shaw, J. G. 634.3-2.77
Toxicants in oils for control of the citrus black fly.
J. econ. Ent., 1947, **40**: 499-504, bibl. 9.
The citrus black fly, *Aleurocanthus woglumi*, is not controlled by its parasite, *Eretmocerus serius*, in parts of Mexico. The authors tested oil emulsions containing benzene hexachloride, chlorinated camphene, chlordane, Lethane 60,

derris, and DDT. They recommend the use of derris. Spraying must be timed so as to minimize damage to fruit.

616. Calavan, E. C., and White, F. A. 634.334-2.8
Dry bark of lemons.
Calif. Citrogr., 1947, **32**: 526, 544, bibl. 2, illus.
This disease, the causative agent of which is unknown, has killed, or rendered worthless, some thousands of lemon trees in California in recent years. Dry bark, which resembles shell bark in several respects, is possibly transmitted through the scion bud. High relative humidity is believed to favour its development. Certain promising selections have been made showing resistance to dry bark and shell bark.

617. Meneghini, M. 634.3-2.8
Sôbre a natureza e transmissibilidade da doença "Tristeza" dos citrus. **(The nature and transmission of the tristeza disease of citrus.)**
O Biológico, 1946, **12**: 285-7, bibl. 1 [received 1947].
The transmission of *tristeza* disease of citrus is reported. In 1945 small seedling grafts (see *H.A.*, 18: 596) 5 to 6 months old were inoculated in the greenhouse with about 50 adults of *Aphis tavaresi* (?) taken from diseased trees in the orchard. The aphids were allowed to feed for a month, and five out of fifty test plants showed leaf symptoms after 3 or 4 months. In 1946, 200 to 300 aphids were allowed to feed for 3 days on healthy seedling grafts, half of which showed symptoms of the disease 3½ months later. In one case, the disease was transmitted by grafting, seven months elapsing before the appearance of symptoms.—Instituto Biológico, São Paulo.

618. Smoyer, K. M. 634.31-2.8
Suggestions on how to get along with quick decline.
Calif. Citrogr., 1947, **33**: 6, 18.
Quick decline of orange trees is a serious disease, which continues to spread in California, "but with vigorous action through a logical and reasonable program of replacement, the losses from this malady can be kept at a minimum with no pronounced effect on the citrus industry as a whole".

619. Myburgh, A. C. 634.3-2.951
Experiments with new insecticides and methods for the control of certain citrus insects [in S. Africa].
Citrus Gr., 1947, No. 165, pp. 8-9.
A short, popular article for growers giving a résumé of the more important results from the 1946-47 experiments. The pests dealt with are citrus thrips, false codling moth, Mediterranean fruit-fly, red scale and the ant *Anopelepis custodiens*.

620. Griffiths, J. T., Jr., and Thompson, W. L. 634.3-2.951
The use of DDT on citrus trees in Florida.
J. econ. Ent., 1947, **40**: 386-8, bibl. 5.
Where DDT was used in Florida in 1944, no detrimental results were noted. In 1945 and 1946, there were serious outbreaks of Florida red scale following five of the six applications. Also higher populations of citrus rust mites, citrus mealy bugs and citrus red mites were noted on DDT sprayed trees. It is therefore concluded that DDT should not be used on citrus foliage in Florida. It is suggested that it might be used with safety for ant control if applied as a dust barrier about the base of young trees or if applied only to heavy limbs and trunks of more mature trees. [Authors' summary.]—Florida Citrus Experiment Station, Lake Alfred.

621. Omer-Cooper, J., Jones, C. M., and Whitehead, G. B. 632.752: 632.96
Predators of mussel scale.
Citrus Gr., 1946, No. 154, p. 12.
Lotis neglecta Muls. and *Lotis* sp. were numerous in an orchard in the Eastern Cape Province; they were associated with the mussel scale *Lepidosaphes pinnaeformis* Bouché.

622. May, A. W. S. 632.754: 634.3
Larger horned citrus bug control with D.D.T.
Qd agric. J., 1947, **65**: 186-7.
DDT has proved very effective against the larger horned citrus bug, *Biprorulus bibax*, but the Maori mite population may increase considerably as a result of its application unless special steps are taken to control them.—Queensland.

Tung.

623. Hayter, C. N. 633.85
Tung nut growing [in Southern Rhodesia].
Rhod. agric. J., 1947, **44**: 248-9.
Short notes on past experience and future prospects. Experience with *Aleurites fordii* has been disappointing, but *A. montana* shows promise. Hints are given on planting.

624. Large, J. R., and others. 633.85-1.531
Longevity of tung seed as affected by storage temperatures.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 147-50, bibl. 3.
Short term trials at Bogalusa, La, and Beltsville, Md, and other observations elsewhere give strong indications that cold storage somewhat depresses the germination of tung seed for about 9 months after harvesting in comparison with seed kept at room temperature. By storage at 34° to 40° F., however, the longevity of the seed is greatly increased.

625. Merrill, S., Jr. 633.85-1.531
Germination of early-planted and late-planted tung seeds as affected by stratification and various seed treatments.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 151-7, bibl. 5.
The effects of the following treatments are discussed:—(1) Stratification of seed in (*a*) warm, damp sand, (*b*) warm, damp sawdust and (*c*) cool, damp sand. (2) Soaking in 1% aqueous morpholine penetrant for 48 hours just before planting. (3) Soaking whole fruits in water 24-48 hours before planting individual seeds. (4) Miscellaneous mechanical treatments of seed. All methods were compared with planting dry, hulled seed 2 in. deep. The interesting but somewhat conflicting results observed are here discussed.

Other crops.

626. Zentmyer, G. A., and Klotz, L. J. 634.653-2.4
Avocado decline.
Calif. Citrogr., 1948, **33**: 116-18.
A disease of avocado trees which occurs primarily on soils that tend to stay wet. *Phytophthora cinnamomi* is practically always associated with the disease for which the term avocado root rot would seem to be more appropriate. Some information is given on the experimental use of soil fumigants as a means of checking the fungus.

627. Everett, P. 634.343
The white sapote. A little-known sub-tropical fruit which can be grown in citrus districts.
N.Z. J. Agric., 1947, **74**: 470.
The white sapote (*Casimiroa edulis* La Llave), a native of Central America, can be grown in suitable localities in New Zealand, and fair crops of fruit of good quality and flavour should be produced if propagation is done with budwood taken from trees for which the climate has proved suitable, and worked on seedling stocks. Budwood should be taken from the ends of fairly mature branches, and the buds inserted when the stock plants are in most active growth. Shield budding is the usual method adopted. Apart from slight thrips injury to the foliage and fruit its only pest or disease in New Zealand is the fungus *Glomerella cingulata*, which causes dark, circular spots on the fruit. This can be controlled by spraying the trees with 1½: 3: 50 bordeaux mixture applied in February, and at intervals of 3 weeks afterwards.

628. MARLOTH, R. H. 634.571
The litchi in South Africa. I. Varieties and propagation. II. Cultural practices and marketing.
Fmg S. Afr., 1947, **22**: 823-30, 863-70, bibl. 7, illus.

This delicious Chinese fruit, *Litchi chinensis*, is being grown on an increasing scale in South Africa, particularly in the eastern Transvaal Lowveld. The only commercial type or variety grown at present is the Mauritius, but many other varieties are under trial at the Subtropical Horticultural Research Station, Nelspruit. The main requirements of the litchi are quoted as being: moist heat in summer, a cool, frost-free winter, preferably on the dry side, and a deep, loamy soil with an abundance of soil moisture. [The statement that " periodic cold snaps between 30° and 40° F. are essential . . . " can be questioned, seeing that excellent litchis are grown in places, e.g. Mauritius, where temperatures never fall to 40° F.] The only method of propagation used by commercial nurserymen is air-layering, a traditional method which would be discarded if a successful grafting technique were to be developed. The litchi being a mycorrhizal plant, all new plantings should be inoculated. Trees are spaced 40-50 ft. apart. Cultural practices are described and the subjects of manuring and irrigation briefly dealt with. Diseases and pests are singularly few at present. Instructions are given for harvesting and packing and a page devoted to marketing. " Good sized trees over 30 years old and well cared for should at least average 250 lb. of fruit per annum." Approximately 29,000 8-lb. trays of S. African litchis were exported to Britain in 1938-39, a trade which it is hoped to revive and expand. The canning of litchis offers possibilities; drying experiments were not encouraging.

629. CAVELL, A. J. 634.62
Basra dates. Relationship between ripening and sugar content of twelve varieties.
J. Soc. chem. Ind. Lond., 1947, **66**: 195-8, bibl. 4.

The predominant sugar in the early stages of development of twelve varieties of dates grown in Iraq is sucrose; as ripening continues, the sucrose diminishes and in ten varieties ripe dates contain no sucrose; ripe dates of the remaining varieties examined contain small amounts of sucrose. A marked difference in composition exists between the Deglet Noor variety of date when grown in U.S.A. and the twelve varieties examined in Iraq, as the former type contains, when fully ripe, a substantial proportion of sucrose. [Author's summary.]

630. REBOUR, H. 634.62
Écologie du dattier en Afrique du Nord. **(The ecology of the date-palm in North Africa.)**
Fruits d'outre Mer, 1947, **2**: 314-17, bibl. 7, illus.

After considering climate, water-supply and soil the author concludes that the risks in experimental work are great, especially when dealing with the date variety Degla, the most delicate.

631. NIXON, R. W., AND REUTHER, W. 634.62-1.547.6
The effect of environmental conditions prior to ripening on maturity and quality of date fruit.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 81-91, bibl. 5.

Tests were made in 1942-1945 on ripening conditions of Halawy and Khadrawy dates on the palm in Coachella Valley, Calif. Among conclusions reached are the following:—1. Fruit on that part of a bunch of dates which was most exposed to direct sunlight ripened a little ahead of the rest of the bunch. This occurred even when the bunch was covered by paper and is presumably a temperature effect. 2. Paper covers caused a slight retardation in ripening probably owing, not only to differences in temperature, but also to a reduction in the rate of dehydration of the ripening fruit. 3. Brown paper covers increased sunburn but not so white paper covers. 4. Two types of shrivel were noticed and are described in the Khadrawy date.

632. CURTIS, O. F. 634.62: 581.13
Diurnal translocation of carbohydrates into date fruits.
Amer. J. Bot., 1947, **34**: 388-91, bibl. 7.

The rapid influx of sugar which characterizes the " khalal " or pre-ripe stage in the development of date fruits seems to occur normally only during the night, with little or no translocation during the day. There was no clear indication of the particular controlling factors that were responsible for this pattern of transport. [Author's summary.]

633. EVREINOFF, V. A. 634.662
Le jujubier. **(The jujube.)**
Rev. hort. Paris, 1945, **117**: 231-3 [received 1947].

An account of the cultivation of the jujube, *Zizyphus sativa*. It thrives in the south of France, where flowering takes place in June or July.

634. ŠAMŠURIN, A. A. 634.662
The " anti-sweetness " effect of *Ziziphus* leaves. [Russian.]
Priroda (Nature), 1947, No. 1, p. 96.

Trees of *Z. jujuba* grow near Samarkand. Tests have shown that the active principle in the leaves, which temporarily inhibits our capacity to taste sweetness after we have chewed the leaves, is a glucoside and not an alkaloid. It can be extracted by means of water, chloroform, and some other organic reagents.

635. MOUAT, H. M. 588.83
Observations on seedling feijoas *Feijoa sellowiana* Berg.) at Mount Albert, Auckland.
N.Z. J. Sci. Tech., 1947, **28**, Sec. A, pp. 332-4, bibl. 8.

Seedling trees of *Feijoa sellowiana* at Mount Albert, Auckland, varied considerably in type, shape, size and quantity of fruit produced. It is recommended that only trees worked with selected scion varieties be used for future plantings.

636. SCHROEDER, C. A. 588.83: 581.162.3
Pollination requirements of the feijoa.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 161-2.

Observations at Los Angeles indicated that (1) the feijoa is pollinated by insects, primarily bees, and (2) most varieties show markedly improved fruit set when cross-pollinated.

Noted.

637.

a LOMBARD, C. A. 634.3-1.8
The fertiliser requirements of citrus trees. Recommendations for the Eastern Cape Coastal area [S. Africa].
Citrus Gr., 1947, No. 166, pp. 3-5.

b MAJOR, F., AND PEARMAN, R. W. 634.973.737
Wattle bark from Jamaica.
Bull. imp. Inst. Lond., 1947, **45**: 12-15.
Single tree samples.

c REBOUR, H. 634.31-1.536-1.16
Influence de la densité de plantation sur la rentabilité des vergers. **(The effect of planting distance on orchard profits.)**
Rev. hort. Paris, 1947, **119**: 390-2.
Oranges.

d SIMONET, M., AND CHOPINET, R. 634.31(449.4)
Contribution à l'étude des variétés d'orangers doux rencontrés dans les Alpes-Maritimes. **(Varieties of sweet orange grown in the Alps-Maritime department.)**
Rev. hort. Paris, 1945, **117**: 270-4, bibl. 9 [received 1947].

TROPICAL CROPS*

General.

638. TER-AVANESJAN, D. V. 581.162.3
Fertilizing plants with limited pollen. [Russian.]
Agrobiologija, 1946, No. 3, pp. 71-8.
From an investigation on a number of crop plants, particularly cotton and okra (*Hibiscus esculentus*), the author finds that, notwithstanding the genetic character of the gametes, the normal course of the sexual process is adversely affected by limiting pollination. It is suggested that pollen tubes which enter the ovary but do not reach the egg cells create an environment necessary for the normal development of the zygotes.

639. MORRILL, A. W., Jr., AND OTANES, F. Q. 632.752
DDT emulsion to control mealybugs and scale.
J. econ. Ent., 1947, **40**: 599-600, bibl. 3.
An emulsion of 20% DDT, 65% xylene, and 10% Triton X-100, diluted to a strength of 5% DDT was applied to various tropical fruits and other plants. One or two applications killed all scale and mealybug, but damaged mango, papaw and palm; the spray was equally effective but not damaging at half strength. No appreciable residual effect was observed.—Philippine Bureau of Plant Industry, Manila, P.I.

640. PLUMMER, C. C., AND SHAW, J. G.
632.77: 634.1/7
DDT and benzene hexachloride to control Mexican fruit fly.
J. econ. Ent., 1947, **40**: 483-6, bibl. 3.
The Mexican fruit fly, *Anastrepha ludens*, on mangoes in Mexico was controlled during the season by four applications of DDT as spray. DDT dust was rendered less effective by the high rainfall. Water-dispersible benzene hexachloride was ineffective.

641. BOND, T. E. T. 632.8(548)
Notes on Ceylon fungi and plant diseases. Part I. (1-15).
Ceylon J. Sci., 1947, **12**: 171-93, bibl. 39.
This first instalment of a projected new series of notes deals entirely with the Fungi Imperfecti. Critical notes are given on 15 species and varieties, of which 6 are new and 4 newly recorded for Ceylon. A list of 8 other species, previously reported for the first time from the Tea Research Institute of Ceylon, is also given.

642. SENARATNA, J. E. 632.95(548)
Some weeds new to Ceylon.
Ceylon J. Sci., 1947, 12: 211-5.
As a result of increased communications with the outside world in recent years foreign plants have been introduced to Ceylon, some of which are now naturalized and likely to become weeds. Six of these are described, viz.: *Alternanthera pungens*, *Evolvulus nummularius* and *Croton sparsiflorus*, all of Tropical America and naturalized in India, *Spigelia anthelmia* of Tropical America naturalized in Java, *Eupatorium conyzoides* and *Croton glandulosus* of N. and Tropical America.

643. THIMANN, K. V. 632.954
Use of 2,4-D weed killers on woody weeds in Cuba.
Science, 1947, **106**: 87.
A note on the use of 2,4-D preparations for destroying *Dichrostachys nutans* and *Comocladia dentata*.—Biol. Labs., Harvard.

644. CHENEY, R. H. 633.7
The biology and economics of the beverage industry.
Econ. Bot., 1947, **1**: 243-75.
The writer gives a popular account of the cultivation of tea, coffee, cacao, yerba maté (*Ilex paraguayensis*), and guaraná (*Paullinia cupana*). Many other beverages are mentioned, and the naranjilla (*Solanum quitoense*), grown commercially in Ecuador, is described at some length.

Tea.

645. POLLACCI, G., AND GALLOTTI, M. 633.72
Acclimatazione del tè in Italia. **(The acclimatization of tea in Italy.)**
Att. Ist. bot. R. Univ. Pavia, 1940, Ser. 4, **12**: 229-55.*
The authors conclude as follows: "A biological form of *Camellia thea* has been selected, and named forma biologica *ticinensis* nobis. Cultivated at Pavia, its leaves show a thein content of 1·5—2·1%. This form is resistant to very low temperatures—20° C. It flowers, fruits and produces fertile seeds without protection in the open and reproduces itself naturally in the Botanic Gardens at Pavia. The leaves submitted to the processing used by the Chinese and Japanese yield a substance capable of taking the place of black tea."

646. TUBBS, F. R. 633.72: 581.1
Physiological investigations [on tea in Ceylon].
Tea Quart., 1947, **19**: 64-8.
The author takes stock of the situation, touching on: pruning, the improvement of existing tea areas, supplying, vegetative propagation, blister blight, plant selection, planting out, early manuring of cuttings, and the possibility of planting cuttings into the field direct.—Tea Res. Inst., Ceylon.

647. GADD, C. H. 633.72-2.651.3+2.8
Disease problems [of tea].
Tea Quart., 1947, **19**: 61-4.
A popular account of two diseases, one caused by the meadow eelworm *Pratylenchus pratensis*, the other *Phloem necrosis*, being a virus disease.—Tea Res. Inst., Ceylon.

648. MANNING, J. D. 633.72-2.4
Developments in the blister blight situation [in South India] during the south-west monsoon, June-September, 1947.
Plant. Chron., 1947, **42**: 505-10.
The result of a year's experience leaves no doubt that this disease is the most damaging with which the tea industry has ever been faced, and there is a real danger that as a result of attacks year after year plantations may be subject to a debilitating effect which might become cumulative in its intensity. However, experience shows that provided the necessity is accepted for a certain tightening up of cultural practices, particularly in regard to pruning, shade and plucking, a very appreciable degree of control can be obtained by agricultural methods, while another safeguard is afforded by chemical control, in special circumstances, particularly in nurseries and when pre-tipping tea. The elimination of the disease as an economic factor is likely to be dependent on developments in plant protection. It is not inconceivable, however, that changes in methods enforced as a result of blister blight will, in themselves, lead to some precise improvements in the way the crop is grown to the eventual benefit of the industry.—Tea Exp. Stat., Devarshola, Nilgiris.

649. TUBBS, F. R. 633.72-2.4
The control of blister blight of tea (*Exobasidium vexans* Massee).
Tea Quart., 1947, **19**: 34-41.
Current views regarding the control of this menacing disease in Ceylon are summarized. The life-history of the causative organism is described and various control measures, mainly concerned with pruning, explained. Present information

* See also *H.A.*, 16: 1075.

does not indicate that stringent control measures are immediately necessary at elevations below 1,500 ft. Amongst the control measures recommended are the following: i. Concentration of the pruning programme to obtain dry weather recovery. ii. Light pruning at the end of dry period. iii. Much lighter pruning when fields have to recover in seasons favourable to blister blight. iv. Fringe pruning at elevations above 3,000 feet, merging into lung pruning at lower elevations. v. Early tipping of all pruned fields as they recover, but not at a lower height above the pruning level than normal. vi. Short rounds, with closer plucking when blister is frequent. vii. Reduction in shade and increase in green manures. viii. Regular spraying at times indicated. ix. Avoidance of excessive applications of fungicides. x. Selection of clones for resistance to blister blight. There is no one measure that will give complete protection; only a judicious use of all these measures can be expected to reduce the effect of the disease to the minimum.—Tea Res. Inst., Ceylon.

650. Norris, R. V., and Tubbs, F. R. 633.72-2.4
An interim report on blister blight situation [in Ceylon] for the information of agency houses.
Tea Quart., 1947, **19**: 41-2.
A note dated 27 June, 1947, amplifying an earlier press communiqué.

651. Allday, C. 633.72-1.542
Blister blight. The influence of early tipping on yield.
Tea Quart., 1947, **19**: 45-8.
It is suggested that tipping be undertaken when the tips of approximately half the primary shoots have reached the tipping level on half the bushes. If this is done the secondaries do not all develop simultaneously and therefore do not all become susceptible to blister blight at one period. It is claimed that the method provides protection against isolated infection periods but not against long periods of weather favourable to infection.

652. van der Kiste, W. R. 633.72-2.4
Blister blight. Some financial aspects of its control.
Tea Quart., 1947, **19**: 48-9.
Exobasidium vexans can be controlled, but will still cause loss of crop, and the control will increase the cost of production. The amount of crop lost will be inversely proportional to the increased expenditure, and the economic mean will be different on every estate. The individual tea planter will have to find out this economic mean. [From author's summary.]

653. Tubbs, F. R. 633.72-2.4
Notes on blister blight.
Tea Quart., 1947, **19**: 50-6.
Deals with the following subjects in note form, any connected account being regarded as premature: red blisters, attacks in old tea fields, resistance of individual bushes and of clones, felling shade trees, cutting-across, the low cut-across, alternative hosts, the influence of manuring, time of pruning, selection of resistant bushes.—Tea Res. Inst., Ceylon.

654. Tunstall, A. C., and Sarmah, K. C. 633.72: 632.4
Notes on stem diseases of tea in north-east India.
Memor. Ind. Tea Ass. Tocklai exp. Stat. **16**, 1947, 77 pp., bibl. 9.
Most of the losses associated with diseases of the woody branches of tea plants may be traced to pruning. The amount of dying back following severe pruning is to a great extent conditioned by the carbohydrate reserves present in the roots at the time. It is important to pluck good bushes prior to severe pruning to ensure that plenty of reserves are present when it is carried out. Wounds low down on the inside of the frames are specially liable to infection and large ones should be avoided by removing unwanted branches while they are small. Chapters in this memorandum are devoted to (1) diseases initiated by vegetable parasites (with particular reference to a stem disease caused by *Nectria cinnabarina*), (2) diseases associated with animal parasites, (3) diseases associated with dead snags, (4) diseases initiated by adverse climatic and cultural conditions, (5) diseases affecting the stems of seedlings, (6) organisms attacking dead tissues, (7) organisms grown on the surface—not known to penetrate living tissues, (8) abnormalities, and (9) mycological notes. Eleven plates show photographs of diseases and abnormalities described and another consists of drawings of mycological details.

Coffee.

655. Anon. 633.73-1.57
Dried coffee pulp—a promising tropical feed.
Agric. Amer., 1947, **7**: 157.
Investigations indicate that dried coffee pulp may be a valuable substitute for maize or other concentrates for feeding livestock. In digestibility and feeding studies the pulp has been found to compare favourably with maize. Mixed with dried banana leaves, molasses, or other feedstuffs, it is palatable.

656. de Fluiter, H. J. 633.73-2.651.3
Het aaltjesprobleem in de koffiecultuur. **(Eelworm problems in coffee.)** [English summary 1 p.]
Tijdschr. PlZiekt., 1947, **53**: 101-9, bibl. 18.
Three pests in Javan coffee plantations are *Heterodera marioni* (Cornu, 1879), *Anguillulina similis* (Cobb, 1893) and *A. pratensis* (de Man, 1881). *H. marioni* is noxious only to nursery plants, on which it causes root galls; infected plants suffer badly, and are sometimes killed. Infection tests on coffee with *Heterodera* eelworms from tobacco and various other plants gave positive results. Two direct control measures are used, (1) the warm water treatment of nursery plants, (2) the starvation method to exterminate the eelworms in infested soils.

657. Notley, F. B., and Sanders, F. R. 633.73-2.754
Antestia, the coffee bug and DDT.
Mon. Bull. Coffee Bd Kenya, 1947, **12**: 128-9.
Experiments in Tanganyika have shown that DDT is more effective against *Antestia lineaticollis* than pyrethrum powder, and cheaper. Instructions are given for making and applying a DDT spray. A note of warning is added by the Senior Coffee Officer, Kenya, advising coffee planters in that country to think carefully before using DDT in case it should kill off natural enemies and lead to the build up of some coffee pest which is now controlled biologically. [cf. build up of red spider in Britain and elsewhere after using DDT sprays in orchards.]

Cacao.

658. Posnette, A. F. 633.74-2.8
Virus diseases of cacao in West Africa. I. Cacao viruses 1A, 1B, 1C and 1D.
Ann. appl. Biol., 1947, **34**: 388-401, bibl. 29.
A brief history is given of swollen-shoot disease of cacao in the Gold Coast, the nomenclature for cacao viruses is discussed, and the symptoms of 4 virus diseases of cacao are described in detail.—West African Cacao Research Institute, Tafo, Gold Coast.

659. Crowdy, S. H., and Posnette, A. F. 633.74-2.8
Virus diseases of cacao in West Africa. II. Cross-immunity experiments with viruses 1A, 1B and 1C.
Ann. appl. Biol., 1947, **34**: 403-11.
Experiments on cross-immunity reactions between three viruses attacking *Theobroma cacao* L. on the Gold Coast are described. Their latent periods were calculated and data obtained on their effects on yield. Their rates of

spread were compared and significant differences shown.—West African Cacao Research Institute, Tafo, Gold Coast.

Rubber.

660. SCHULTES, R. E., AND URIBE H., A. 633.912
The future of rubber growing in Colombia.
Agric. Amer., 1947, **7**: 127-30.
Optimism is expressed in the future of the industry. Smallholders are to be favoured. Improved clonal material only is to be planted.

661. PHILPOTT, M. W. 633.912-1.531
Rubber seed [for oil production].
Quart. Circ. Ceylon Rubb. Res. Scheme, 1947, **24**: 36-8, bibl. 10.
It is suggested that the possibility of exploiting the seed of *Hevea braziliensis* as a source of oil should be re-examined now that oil prices are high. The seed yields a drying-oil which, although inferior to linseed oil, is suitable for use in paint. Its main defect is its high free acidity which, however, can be prevented by heat-treatment of the fresh seed. It has also been suggested that the oil might be edible. No reliable figures are available showing average yield of seed per acre or the cost of collecting it. Assuming 6 tons of seed are needed to produce a ton of oil worth Rs. 1,500, the oil expeller would, possibly, pay Rs. 166 per ton for seed delivered or Rs. 143 ex estate. It seems reasonably safe to conclude that collection would be worth while in Ceylon today if a labourer (at Rs. 1.40) brought in 30 lb. of seed per day and a child (at Re. 1) 29 lb.

662. ANON. 633.912-1.541.5
Budgrafting without waxed budding tape.
Circ. Rubb. Res. Inst. Malaya **25**, 1947, pp. 3.
Changes in budding technique have become necessary owing to the shortage and expense of cloth and wax. A method of bud-grafting is described and illustrated using coconut fronds and hessian string instead of waxed bandages.

663. ANON. 633.912-1.543.82
Notes on hedge planting of rubber.
Circ. Rubb. Res. Inst. Malaya **26**, 1947, pp. 8.
An account of a method used in mixed planting and exploited in the N.E.I. for making full use of the area allowed under the pre-war scheme intended to restrict rubber production. Trees are spaced as close as 3 ft. apart in rows up to 75 ft. apart. The various advantages claimed for hedge planting are discussed.

664. GUEST, E. 633.912-1.55-1.8
Experiments with economic tapping systems (3). Tapping-cum-manuring experiments on young mature rubber trees: Part I.
J. Rubb. Res. Inst. Malaya **10**: 147-77, 1940 being *Commun. R.R.I.M.* **253** [received 1948].
The first year results from 3 experiments (2 on budded and 1 on seedling trees) are presented. Tapping results only are discussed as no fertilizer effects had been detected either in growth or yield. The reduction of tapping intensity to 67% in the A.B.C. periodic tapping systems resulted in a loss of crop of approximately 25% (200-250 lb. per acre) as compared with the normal 100% continuous tapping system. The yield per tapping was, however, higher in the 67% periodic systems and in consequence tapping cost was reduced by about 10%. Daily periodic tapping also proved more efficient than the normal alternate-daily system in one experiment. With daily tapping the percentage of low-grade crop was less than with alternate-daily tapping, but the wide range of dry-rubber-content throughout the month was a drawback. In the two experiments on 9- to 10-years-old budgrafts monthly periods of tapping and rest proved too long for optimum yields. Negative correlation between growth and yield (or tapping intensity) was shown in all three experiments. [From author's summary:]—Rubber Research Inst. Malaya.

665. DE SILVA, C. A. 633.912-1.55
Yields of budded rubber and clonal seedlings in commercial tapping [in Ceylon].
Quart. Circ. Ceylon Rubb. Res. Scheme, 1947, **24**: 3-8.
A delayed report on 1945 yields. Returns were examined for 66 estates totalling over 5,000 acres. Many of these returns have been omitted from the report for various reasons. Tables show the yields of clones and clonal seedlings at various ages on different estates. Evidence shows that the double-three system is unsuitable for high-yielding clones, at least during their first 10 years of tapping. There has been a tendency in the past to reach the 1,000 lb. per acre level before the normal yielding capacity of the clones permits. Notes are given on the performance of the following clones and certain recommendations made: TJ.1, TJ.16, BD.5, Avros 49 and 50, GL.1, PB. 86 and 186, HC. 28 and 55. TJ.1 remains the most reliable high-yielding clone under various climatic conditions; TJ.16 yields less on the whole than TJ.1; BD.5 compares favourably in yield with TJ.1 but has certain disadvantages. The early yields from clonal seedlings from the Prang Besar Isolated Garden continue to be very promising. The planting of seedling material is becoming increasingly popular in Ceylon but unless the seed is well chosen and the correct planting and thinning procedure followed there is little chance of clonal seedlings coming up to the standard of the better-known high-yielding clones of budded rubber. See *H.A.*, 17: 421.

666. DE SILVA, C. A. 633.912-1.55
Field experiments on Dartonfield estate. XXX. Comparison of tapping systems.
Quart. Circ. Ceylon Rubb. Res. Scheme, 1947, **24**: 9-18, bibl. 8.
The experiments, completed in 1947, are described and the cumulative results over a 10-year cycle discussed. The annual results from 11 tapping systems are set out in tabular form. Yields are expressed as a percentage of the control and the significant difference shown. The dry rubber content and the bark renewal in the case of all the systems was regarded as satisfactory. The relative cost of tapping by each system is given and the number of brown bast cases recorded.

667. SHARP, C. C. T., AND DE SILVA, C. A. 633.912-1.55
Two intensive tapping experiments with upward tapping.
Quart. Circ. Ceylon Rubb. Res. Scheme, 1947, **24**: 18-22, bibl. 1.
In experiment A the tapping systems compared were: No. 1, Double-one 2S/2, d/1 (2x d/2) 400%; No. 2, Double-one 2S/2, d/2 (2x2d/4) 200%; and No. 3 (control), Double-two 2S/2, d/2, 200%. In experiment B, system No. 4 (same as 1) was compared with No. 5, which differed from 4 in that all four cuts were tapped on the same day and the trees on alternate days, 4S/2, d/2 400%. Experiment A demonstrated that higher yields are obtained if upward tapping is adopted at the start of slaughter tapping. It is also shown that when four cuts are opened it is an advantage to tap them all on the same day rather than two cuts on one day and two on the next. The conclusion drawn from a previous experiment, that tapping at 400% intensity is not profitable for more than six months, is confirmed.

668. RHOADS, A. S. 633.913-2.4
An unusual case of *Clitocybe* root rot in *Ficus elastica* propagation stock in a Florida nursery.
Phytopathology, 1947, **37**: 523-4.
Severe infection of *Ficus elastica* by *Clitocybe tabescens* was estimated to have killed 20-25% of the original stock planting

and some of the newly set stock. Sprinkling the plants daily to keep the moss layers wet was highly conducive to infection and the extremely rapid development and spread of the disease.

669. MARTIN, W. J. 633.912-2.48
Alternaria leaf blight of Hevea rubber trees.
Phytopathology, 1947, **37**: 609-12.
A leaf blight, causing severe defoliation, and due to a species of *Alternaria*, was found on a particular clone (GA—1279) of *Hevea brasiliensis* in a Mexican experimental plantation in 1946. Other clones in the garden were unaffected and the blight was of little or no importance on any of the 135 other clones on the station.—U.S. Dept. Agriculture.

Fruits.

670. BARNETT, G. B. 634.771(941)
Banana culture in Western Australia.
J. Dep. Agric. W. Aust., 1947, **24**: 79-139.
This account covers such operations as cultivation, cover crops (to provide humus before planting), windbreaks (the plantain is recommended as a temporary windbreak), irrigation, propagation, weed control, harvesting, grading and packing (various packs illustrated). There are 40 illustrations.

671. RIBEIRO, M. G. 634.771(649)
Análise de bananas da ilha da Madeira. (**An analysis of bananas of the Madeira Islands.**)
Bol. Junta nac. Frutas, Lisbon, 1947, **7**: 42-50, bibl. 7.
Analyses are given of bananas from various parts of the islands. Their sugar and protein content compares favourably with that of bananas from other parts of the world. In its food value the banana stands high among other fruits; its carbohydrate content is high and its protein content is superior to that of a number of other fruits with which it is compared.

672. WARDLAW, C. W. 634.711-2.48
Control of banana wilt disease.
Nature, 1947, **160**: 405, bibl. 1.
Panama (wilt) disease due to *Fusarium oxysporum cubense* has been controlled in Honduras by flood-fallowing; infected fields flooded for six months have produced fruit for nearly six years with only sporadic outbreaks of disease [see also *H.A.*, 11: 1434].

673. MAGEE, C. J. 634.771-2.4
Root diseases of the banana.
Agric. Gaz. N.S.W., 1947, **58**: 419-22.
Short descriptions of Panama disease (*Fusarium oxysporum cubense*), Rhizoctonia root rot (*Rhizoctonia solani*), root-knot (*Heterodera marioni*), and corm rot (*Clitocybe* sp. and *Armillaria mellea*).

674. ANON. 634.771-2.8
Rayadilla threatens Colombia's bananas.
Agric. Amer., 1947, **7**: 137, illus.
A note on a devastating disease, Rayadilla, first noted in 1941, which attacks all members of the *Musaceae*, including *Ravenala*. The causative agent is unknown. A virus is suspected.

675. MCCANN, L. P. 634.74
Ecuador's naranjilla—a reluctant guest.
Agric. Amer., 1947, **7**: 146-9, bibl. 4, illus.
Efforts in the U.S.A. to acclimatize the South American naranjilla, *Solanum quitoense*, which yields a delicious fruit-juice, have so far failed. Experience seems to show that the naranjilla can thrive only in its native habitat of Ecuador and perhaps in other areas having an Andean equatorial climate.

676. COURTENAY, C. E. 634.774: 664.85.774.036.5
The reconstruction of the Malayan canned pineapple* industry. I. The pre-war industry and the problem of post-war reconstruction.
Malay. agric. J., 1947, **30**: 183-90.
The pre-war Malayan pineapple pack amounted to 2½ million cases per annum and accounted for 80% of the world export trade in canned pineapples. The author describes this pre-war industry, drawing attention to its many shortcomings, and summarizes some of the more important problems involved in post-war reconstruction. The task which now confronts the industry is not one of re-establishment on the pre-war basis, but of reconstruction according to a new design in which little of the previous structure can be incorporated.

Other crops.

677. CAMPBELL, J. A., AND BROWN, O. A. 633.492-1.536
A new transplanter for sweet potatoes and other vegetables.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 281-6.
The transplanter is mounted behind a tractor and is suitable for use in small fields. Photographs show its general layout. Its advantages are stressed.—Crystal Springs, Miss.

678. RUDKIN, G. O., AND NELSON, J. M. 633.492: 581.192
Chlorogenic acid and respiration of sweet potatoes.
J. Amer. chem. Soc., 1947, **69**: 1470-5, bibl. 12.
Two substances have been isolated from sweet potatoes. One of these has been shown to be chlorogenic acid, and the other to be closely related to chlorogenic acid. It has been shown that chlorogenic acid and the other phenolic compounds, designated as component A, can play the role of a hydrogen carrier next to the terminal oxidase in a respiratory chain of the sweet potato. [Authors' summary.] —Columbia University.

679. PERSON, L. H. 633.492-2.3
Soil rot of sweet potatoes and its control with sulphur.
Bull. La agric. Exp. Stat. **408**, 1946, pp. 15.
Since 1934, serious losses to crops of *Ipomoea batatas* grown in Louisiana have been caused by the soil-infecting organism *Actinomyces ipomoea*. The relation of soil rot disease to soil acidity and rainfall was studied. By applying sulphur at rates of 500 to 800 lb. per acre it was possible to lower the pH value of the soil in typical fields to about 5·0 and maintain it at that level for 4 to 6 years. With this treatment large increases in yield of sweet potatoes were obtained, especially in dry years when the incidence of the disease among untreated plants was most severe.

680. MCCLEAN, A. P. D., AND KLESSER, P. J. 633.492-2.8
Mottle-leaf disease of the sweet potato.
Fmg S. Afr., 1947, **22**: 897-900, bibl. 2, illus.
A preliminary account of a disease hitherto unrecorded in South Africa and probably the same as one reported from East Africa for the first time in 1944. Tentative suggestions are made for checking the spread of the disease which appears to be of the virus type.—Div. of Bot. and Plant Path., Dep. of Agric., S. Africa.

681. JAKUŠKINA, I. V., AND NIKITINA, 1. L. (Editors). 633.52
Breeding, variety testing, and seed production in hemp, Abutilon, Hibiscus, and jute. [Russian.]
Summary of the plenary meeting of the section on technical crops, 20-24 March, 1938.
Editorial and publishing section of the Lenin Acad. Agric. Sci. U.S.S.R., Moscow, 1939, 56 pp. [received 1947].

* See also 731.

The booklet consists of eight short articles by different authors and a copy of the resolution passed by the plenary meeting. As the title suggests, the practical grower will find little on how to raise the crops dealt with, though he will find among the varieties and geographical types some useful information on the length of the maturing period, yield of fibre and seed, monoecious varieties of hemp, the elimination of differences between male and female hemp plants, and the growing of southern varieties in central and northern parts of the U.S.S.R.

682. Gonzalez, L. G., and Bunoan, J. C., Jr. 633.85
Variability of pili trees grown in the college of agriculture.
Philipp. Agric., 1947, **31**: 60-5, bibl. 9.
This tree, *Canarium ovatum*, has many uses. Its nuts, valued as a source of oil and protein, are exported from the Philippines. The results of a study of variability in plant and fruit characters amongst a population of 95 seedling pili trees are recorded. Approximately 55% of this population was female and the rest male. Trees varied greatly in their fruiting season, yield, and quality of fruit.—Univ. of the Philippines.

683. Coomber, H. E., and Cosgrove, D. J. 633.85
Lemongrass oil from Tanganyika.
Bull. imp. Inst. Lond., 1947, **45**: 3-6.
The authors conclude that the grass must be fully mature before cutting and that the cutting should be done after a spell of dry weather. They suggest that the possibility of re-establishing the crop on manured ground at frequent intervals and the distillation of freshly-cut grass without partial drying might well be considered.

684. White, D. G. 633.854.5
Longevity of bamboo seed under different storage conditions.
Trop. Agriculture, Trin., 1947, **24**: 51-3, bibl. 1, illus.
The species used in this study was *Bambusa arundinacea*. The most practical method of preserving viability was storage over calcium chloride at room temperature. Bamboo seed offers an easy and economical method of propagation but unfortunately clump bamboos flower and fruit at intervals of 20 to 60 years or more from seed. Many advantages would be gained by the discovery of a means to induce flowering and seeding of bamboo and thereby reduce the present high cost of propagation by vegetative methods. —U.S.D.A., Mayaguez, Porto Rico.

685. Puntambekar, S. V. [illegible] 633.88
Effect of storage on the alkaloidal content of *Strychnos nux-vomica* seeds.
Curr. Sci., 1947, **16**: 346, bibl. 1.
Analyses carried out over a storage period of 16 years show that the total alkaloid and strychnine contents of the seeds remained practically unaltered.

686. Fosberg, F. R. 633.88.51
Cinchona plantation in the New World.
Econ. Bot., 1947, **1**: 330-3.
A popular account of a plantation in Guatemala, opened in 1934; seeds from many different sources have provided a wide range of material for selection.

687. Greenway, P. J. 633.88: 633.7
Khat [*Catha edulis*].
E. Afr. agric. J., 1947, **13**: 98-102, bibl. 21, illus.
A botanical description of this ancient drug plant is followed by notes on its distribution, ecology, uses, cultivation, varieties, chemical composition and effects on man. Khat leaves, which contain the alkaloids *cathine*, *cathinine* and *cathidine*, are used as a beverage or a masticatory by a large proportion of the population of S.W. Arabia, the Somalis, the Abyssinians and, to a certain extent, the natives of East Africa.—East African Agric. Res. Inst.

688. Pech, H., de Bildering, N., and Henry, P. 634.61-1.531
Activation de la germination des graines de palmier à huile. **(Stimulating the germination of oil palm nuts.)**
Oléagineux, 1947, **2**: 493-9, bibl. 3.
An account of a controlled experiment in which 7 treatments, each quadruplicated, were tested and the results analysed by Fisher's method. In the treatment which gave the highest percentage of germinated nuts in the shortest time, over 80% in 4 months, the nuts were removed from the hot-house (kept at 35-40° C.) for 24 hours every 15 days, after the first 2 months under glass. It is suggested that the stimulation to germination brought about by this cooling treatment is analogous to the results obtained in the vernalization of temperate plants. Experiments have been laid down to test this hypothesis. See *H.A.*, 7: 759.

689. Capinpin, J. M., and Sison, J. M. 635.64: 631.523
Heterosis in tomato.
Philipp. Agric., 1947, **31**: 23-33, bibl. 8.
The tomato is particularly suited to hybrid seed production owing to the simplicity of its flower structure, abundance of seed produced, and the ease with which the flowers can be handled. An account is given of experiments which had as one objective the discovery of the best hybrid combination for hybrid seed production. For this purpose the cross Native × Susong Kalabaw is recommended.—Univ. of the Philippines.

690. Frazier, W. A., Kikuta, K., and Hendrix, J. W. 635.64: 632.4
Breeding tomatoes for combined resistance to Fusarium wilt, spotted wilt, and gray leaf spot in Hawaii.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 235-40, bibl. 4.
Considerable progress is reported. Most of the combined resistance lines are early, determinate, even-ripening (with white immature fruit colour) types, with ability to set fruit well under Hawaian conditions.

Noted.

691.

a Bouriquet, G. 632.3/4(691)
Les maladies des plantes cultivées à Madagascar. **(Diseases of plants cultivated in Madagascar.)** Lechevâlier, Paris, 1946, pp. 545, figs. 230, 48 plates, reviewed in *C.R. Acad. Agric.*, 1947, **33**: 418-9.

b Crandall, B. S., and Swingle, C. F. 635.64: 632.3/8
Studies of tomato diseases in the Amazon Basin of Peru (Preliminary report).
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 267-9.

c Kikuta, K., and Frazier, W. A. 635.64: 632.8
Preliminary report on breeding tomatoes for resistance to tobacco mosaic virus.—Hawaii.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 256-62, bibl. 7.

d Moutia, L. A., and Mamet, R. 632.6/7(698.2)
An annotated list of insects and acarina of economic importance in Mauritius.
Bull. Sci. Ser. Mauritius Dep. Agric. **29**, 1947, 43 pp., bibl. 6, price 75 cents.

e SEÍN, F., AND ADSUAR, J. 634.651-2.8
Transmission of the bunchy top disease of papaya (*Carica papaya* L.) by the leaf hopper *Empoasca papayae* Oman.
Science, 1947, **106**: 130, bibl. 3.—Rio Piedras, P.R.

f SILVA, P., AND LELLIS, W. T. 633.74-2.3/4+2.8
Cacao disease in Brazil.
Trop. Agriculture, Trin., 1947, **24**: 56.
The more important cacao diseases observed to date.

g SWINGLE, C. F. 634.651
The Peruvian cooking papaya, *Carica monoica*, a promising new fruit and vegetable for the United States Corn Belt.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 137-8.

h DE TOLEDO, A. A. 633.73-2.76
Estudos estatísticos da infestação num cafezal pela broca "*Hypothenemus hampei* (Ferr., 1867)" (*Col. Ipidae*). **(Statistical studies of the infestation of a coffee plantation by the coffee berry borer.)** [English summary.]
Arq. Inst. biol., São Paulo, 1945, **16**: 27-39, bibl. 1.

STORAGE.

692. AUBERT, P. 664.85.11
Pertes de poids lors de la conservation des fruits. **(Loss of weight in fruit during storage.)**
Rev. romande Agric. Vitic., 1946, **2**: 85-7.
The results of trials at Lausanne-Pully on loss from evaporation are described, with three apple varieties, viz. Tasma, Franc Roseau and Belle de Boskoop, under three conditions of storage, viz. (1) ordinary storage, a cellar temperature of 12-13° C., progressively lowered to 3-5° C. in January and February, humidity artificially maintained at 80-85 degrees, (2) cold chamber at a constant temperature of 4-5° C., humidity 90 degrees, (3) cold chamber at 2° C., humidity 90 degrees. Trials with waxed wraps were also used for Belle de Boskoop. The results are shown graphically. Belle de Boskoop is more subject to loss from evaporation than the other two varieties; its loss of weight in 105 days in ordinary storage was 10·8%, and at 2° C. for 185 days 6·8%. This variety should not be wrapped unless the fruits have ripened and coloured on the tree.

693. SYKES, S. M. 664.85
Mould wastage in the storage and transport of fruit.
Fd Pres. Quart., 1947, **7**: 5-9, bibl. 2.
Factors affecting the resistance of fruit to fungal infection include variety, locality, soil, rainfall, and manurial treatment. Orchard sanitation helps to reduce storage rots. Late harvesting may lead to increased wastage, and harvesting should not be delayed unduly after using pre-harvest hormone sprays. Large fruits appear more susceptible to rot than small: this may be indirectly due to maturity. Old picking-boxes should be sterilized. Fruit should not be harvested soon after rain. The use of coatings and wraps is still in the experimental stage. Fruit should reach the cool store with the least delay and it should then be cooled rapidly; over-storage should be avoided. Fruit sent by rail should be packed in such a way as to allow for ventilation.

694. CLAYPOOL, L. L., AND ALLEN, F. W. 664.85.035.1
Modified atmospheres in relation to the transportation of deciduous fruits.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 92-8, bibl. 8.
Experiments in California suggest that there may be a future for shipping certain fruits long distances in the U.S.A., stored, non-refrigerated, in controlled atmosphere. Promising results were obtained at 65° F. with low O_2 on plums, pears and peaches and with high CO_2 on plums, pears and grapes.

695. FIDLER, J. C. 664.85.11.035.1+664.85.13.035.1
The refrigerated gas storage of fruit.
Fruitgrower, 1947, **104**: 774.
In this paper, read in Belgium, the author outlines recent research and present practice in the storage of apples and pears in England. Oil emulsions may find a place in fruit storage, but only as an adjunct to gas storage.—Ditton Lab., East Malling.

696. HUELIN, F. E., AND TINDALE, G. B. 664.85.22.035.1
The gas storage of Victorian apples.
J. Dep. Agric. Vict., 1947, **45**: 74-80, bibl. 17.
Investigations have been carried out over several years on the gas storage of Jonathan, King Cole, Delicious, Granny Smith, Stewart, London Pippin, Rome Beauty, and Democrat apples. Gas storage delayed ripening and in particular lessened the deterioration in quality which is normal in long-stored fruit. Gas storage also reduced mould wastage and controlled Jonathan spot and bitter pit. Superficial scald may be increased by gas storage, but this can usually be controlled by the use of oil wraps, while brown heart may develop in certain atmospheres. Promising results were obtained with the Jonathan, Granny Smith and Democrat varieties. The best storage conditions are:—For Jonathan, 5% CO_2, 16% O_2 at 36° F. till end of April, 34° F. during May, and 32° F. subsequently; for Granny Smith, 5% CO_2, 16% O_2 at 31-32° F.; for Democrat, 5% CO_2, 16% O_2 at 31-32° F. [Authors' summary.]

697. ASKEW, H. O., AND KIDSON, E. B. 664.85.11: 577.16
Changes in vitamin C content and acidity of apples during cool storage.
N.Z. J. Sci. Tech., 1947, **28**, Sec. A, pp. 344-51, bibl. 3.
The vitamin C content of the flesh, skin and whole fruit of 7 varieties of apple held in cool store 3 to 7 months was determined at monthly intervals. During the first two or three months the vitamin C content of all varieties except Sturmer decreased rapidly, in the skin more quickly than in the flesh; later the rate of loss was much lower. In Sturmer the vitamin C content remained practically constant for 7 months. Titratable acidity of the juice decreased markedly with length of storage.

698. MARSHALL, R. E. 664.85.11.037
Modern cold storage for apples.
Trans. Ill. St. hort. Soc. for 1946, 1947, pp. 92-101.
An informative discussion on cold stores for farms, with particular reference to Michigan, where probably 35-40% of the total storage capacity on farms is now refrigerated, most farm stores holding 10,000-14,000 bushels. The subject is discussed under the following heads: construction and insulation of stores, refrigeration equipment, forced air circulation cooling units.

699. ULRICH, R. 664.85.13.037
Conservation des poires Williams dans l'air et en atmosphères contrôlées, a 0 et 4° C. **(Storage of Williams pears in air and in controlled atmospheres at 0 and 4° C.)**
C.R. Acad. Agric. Fr., 1947, **33**: 322-3.

The data obtained show that the best results were obtained in an atmosphere containing 2% oxygen, 4% CO_2 and 94% nitrogen, at 0° C.

700. O'Reilly, H. J. 664.85.25.035.1
Peach storage in modified atmospheres.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 99-106, bibl. 15.
1. 32° F. appeared to be a more suitable temperature than 40° F. at which to store peaches both in air and modified atmospheres. 2. A delay of 2 to 5 days prior to cold storage was required to prevent the onset of a mealy type of storage breakdown. The necessary period of delay varied with the maturity at which the fruit was harvested. 3. Even mature fruit at harvest was less likely to develop mealy breakdown when placed in cold storage after a suitable delay at 75° ± 5°F. 4. The lower levels of carbon dioxide and oxygen (that is 2% carbon dioxide 2% oxygen, 2% carbon dioxide 5% oxygen, and 5% carbon dioxide 2% oxygen) when used as storage atmospheres appeared more satisfactory than atmospheres containing 10% carbon dioxide. At this concentration off flavors occurred in the fruit. 5. Fruit stored in modified atmospheres preceded by a suitable delay did not have an appreciably longer storage life than that of corresponding delayed lots held in air. [Author's summary.]—Ithaca, N.Y.

701. Smith, W. H. 664.85.22.037
Extending the storage life of the Victoria plum.
J. Pomol., 1947, **23**: 92-8, bibl. 13.
It is shown that complete control of internal browning of Victoria plums stored at 31° F. immediately after picking was achieved by the treatment of storing at 65° F. for 2 days, interposed at a point in time between the 15th and 20th day from the start. The plums so treated subsequently ripened normally after they had been stored for a further 15-20 days at 31° F. After more extended storage at 31° F. (50-51 days) internal browning was appreciable in amount, but still less than in the control samples treated at the 40th day. A period of treatment of 2 days rather than of 1 day was found preferable. Plums of a range of maturity at picking (but excluding soft fruits) were found to have reacted favourably to the treatment when examined after 40 days at 31° F. The less mature plums, however, were of poorer quality than those of the more mature grades. After 50-51 days at 31° F., by which time the inhibition of internal browning was only partially successful, the less mature had suffered more extensive damage than the more mature fruit. [Author's summary.]—Ditton Lab., D.S.I.R. East Malling, Kent.

702. Johns, C. K. 664.85.73.037
Cooling controls invisible mould in blueberries.
Canad. Fd Ind., 1947, **18**: 11: 22-5.
Wild blueberries are harvested on a large scale in the Lake St. John-Saguenay area of Quebec. Rejection on account of moulds developed during railing in refrigerated cars can be avoided by cooling the berries rapidly as they arrive at the packing station.

703. Schwennesen, A. W. 664.85.334
Grapefruit storage experiment.
Fruit and Produce, 1947, **2**: 3: 9-10.
Grapefruit was kept for 17 weeks with little wastage in a small store. The walls are of charcoal packed between wire netting, and kept moist; the roof and floor, which is raised off the ground, are of wood and are insulated with charcoal. The method would be useful where atmospheric humidity is low.—Melbourne, Australia.

704. Luckwill, L. C. 664.84.21
Stored potatoes need not sprout.
Grower, 1947, **29**: 25-6, illus.
A short, popular article describing the use of the plant hormone methyl-alpha-naphthyl-acetate (MANA) for inhibiting the sprouting of potatoes during storage. Not only can sprouting be inhibited but the tubers can be kept in firm condition for 9 or 10 months after harvest, or even longer. No undesirable taint is given to the tubers, and there is no evidence which suggests that the hormone is in any way harmful to man. To treat 1 ton of potatoes dissolve 1 oz. (by weight) of MANA in ½ pint of methylated spirit, or acetone, and spray the solution evenly over 3 lb. of newspaper torn up into strips 3-6 in. long and about ½ in. wide. Allow the spirit to evaporate and then store the impregnated paper in an airtight container until wanted. Potatoes required for late keeping should be treated in February by scattering the impregnated paper among them. After treatment they must be stored in a confined and draught-proof place. The cost of such treatment would be about £1 per ton. There are other sprout-inhibiting substances under trial, of which the most promising to date is methyl-1-naphthyl-methyl-ether (MNME), the active principle of Belvitan K which appeared on the German market during the Hitler war.—Long Ashton Research Station, England.

705. Denny, F. E. 581.12: 664.84
Respiration rate of plant tissue under conditions for the progressive partial depletion of the oxygen supply.
Contr. Boyce Thompson Inst., 1947, **14**: 411-42, bibl. 18.
Tests with tubers of potato and Jerusalem artichoke and seedlings of wheat showed that when the oxygen concentration fell to 10 to 15%, O_2 consumption fell by 4 to 5% and CO_2 production by 2 to 3%. Tests with *Pelargonium* leaves showed similar, but insignificant changes.

706. Folsom, D. 664.84.21
Inheritance of predisposition of potato varieties to internal mahogany browning of the tubers.
Amer. Potato J., 1947, **24**: 294-8, bibl. 4.
Predisposition to browning varies from one commercial or seedling variety to another and is inherited. The relative amount of injury as between varieties may change with the temperature of storage. [From author's summary.]

707. Potgieter, M., and Cowell, C. 664.84.34.037
Effect of packing kale in chipped ice.
Abstract in *Food*, 1947, **16**: 346.
Kale stored in chipped ice for 6 days showed less loss of ascorbic acid, moisture, and weight (due to spoilage), and was more palatable than kale stored at room temperature.

708. Carolus, R. L., Lee, S. H., and Vandemark, J. S. 664.84.35: 577.17
Effect of the methyl ester of α-naphthaleneacetic acid on the storage life of cauliflower.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 367-9.
At 32 ± 2° F. with humidity 80% to 90% the inclusion of shredded paper impregnated with the methyl ester of α-naphthaleneacetic acid with stored cauliflowers markedly retarded the development of an abscission layer in the leaves. At 60° F. the curd was broken up and individual florets in some cases grew as much as 3 inches in 60 days. This observation suggests the possible use of NA treatment to help in the production of vegetable seed.—East Lansing, Mich.

709. Granovsky, A. A. 635.944: 632.951
Control of gladiolus thrips and other insects in storage.
Minn. Hort., 1947, **75**: 117-9, being *Pap. Misc. J. Ser. Minn. agric. Exp. Stat.* **575**.
A single dusting with 5% DDT is enough to control most pests of stored gladiolus corms. The tulip bulb aphid can be controlled by dusting the corms with preparations of nicotine or pyrethrum. All storage insects can also be controlled by fumigation with naphthalene flakes.

710. CHOUARD, P. 664.85
État des recherches scientifiques sur le procédé Krebser de conservation des fruits et fromages par la mousse. **(Research on the Krebser method of storing fruit and cheese with the aid of moss.)**
Rev. hort. Paris, 1947, **119**: 422-4, bibl. 1.
An outline of the early results of an investigation of the role of moss used in the Krebser method.*

711. SCOTT, L. E., AND TEWFIK, S. 664.84+664.85
Atmospheric changes occurring in film-wrapped packages of vegetables and fruits.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 130-6.
At College Park, Md, the atmospheric content of film-enclosed packets of tomatoes, sweet corn, snap and lima beans and apples was tested. Where the film remained intact, high CO_2 and low O_2 concentrations were found to occur and to have deleterious effects on the stored products. The effect varied with the type of film, kind of produce, time wrapped and temperature.

712. MORRIS, T. N. 664.8.037
Refrigeration as a method of food preservation.
Research, 1947, **1**: 111-5, bibl. 16.
The author discusses chilling, refrigerated gas storage, frozen storage, and the relation of these to other methods of food storage. Provided the appropriate precautions are taken, there is little to choose between frozen, canned and dehydrated foods as regards nutritive value and convenience. Chilled foods are, however, more comparable with fresh foods.—Low Temperature Research Station, Cambridge and D.S.I.R.

713. DELEPIÈRE, R. 664.84/85.037
Le quick-freezing.
Ann. Gembloux, 1947, **53**: 177-95, bibl. 38.
Survey of recent developments, chiefly in the U.S. In Belgium quick freezing may be useful in raising the quality of exported foods, in providing semi-prepared foods for local use and in preserving foods for sale out of season.

714. BAUERNFEIND, J. C., SMITH, E. G., AND SIEMERS, G. F. 664.85.11.037
Processing frozen sliced apples with l-ascorbic acid.
Fruit Prod. J., 1947, **27**: 68-71, bibl. 13.
The commercial application of the process [*ibid.*, 1946, 26: 4; *H.A.*, 16: 2268] is described.

715. TALBERT, T. J. 664.85.11.037
Some new ideas in frozen apples.
Trans. Ill. St. hort. Soc. for 1946, 1947, pp. 83-5.
The main suggestion is that apples should be offered to the public as a ready to use frozen food product, packed in small and large containers.

Noted

716.

a JONES, B. M. 664.8: 632.951
An experiment with DDT against pests of stored products.
Bull. ent. Res., 1947, **38**: 347-52, bibl. 3.

b PHILLIPS, W. R. 664.84.037+664.85.037
Freezing rates of fruits and vegetables at various air velocities.
Contr. Div. Hort., Exp. Farms Serv., Canada **670,** 1947, pp. 6, bibl. 7.

c PIETTRE, M. 664.85.53.037
Présentation de châtaignes conservées sept mois au froid en "atmosphère gazeuse". **(An exhibit of chestnuts stored for seven months in a gas mixture at low temperature.)**
C.R. Acad. Agric. Fr., 1947, **33**: 294-5.
Successful, but no details given.

d ROLL-HANSEN, J. 664.84
Lagring av grønnsaker. **(The storage of vegetables.)**
Flygeskr. Statens plantepat. Inst., Oslo, **36,** 1944, pp. 4 [received 1947].

* See *H.A.*, 16: 2245.

PROCESSING AND PLANT PRODUCTS.

717. SCHRADER, A. L., AND THOMPSON, A. H. 664.85.11.047
Factors influencing the keeping quality of dehydrated apples.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 125-9, bibl. 5.
Factors considered are sulphuring, blanching, dehydration process, packing and storing.

718. SMITH, G. M. 664.85.11.047
Equipment for the sulphiting of apple slices.
N.Z. J. Sci. Tech., 1946, **28,** Sec. A, pp. 284-8.
A description of a machine designed by the Chemical Engineering Section of the Dominion Laboratory for dipping apple slices into sulphite solution prior to dehydration.

719. ALLEN, R. J. L., AND MAPSON, L. W. 664.84.047: 577.16
The drying of vegetables. VI. Loss of ascorbic acid in drying cabbage and potato in large-scale factory plants.
J. Soc. chem. Indust. Lond., 1947, **66**: 166-8, bibl. 4.
Cabbage.—Leaching during the scalding treatment is responsible for the reduced retention of ascorbic acid (51-54%) in the factory compared with the laboratory process reported earlier [*ibid.*, 1943, 62: 145-60; *H.A.*, 14: 934]. Potato.—57% of the ascorbic acid was retained in dried potato strip. Losses in the factory are greater during scalding and less during drying than in the laboratory; the final retention was similar for large- and small-scale processes.

720. LEGAULT, R. R., AND OTHERS. 664.84.047
Browning of dehydrated vegetables during storage.
Industr. Engng Chem. (*Industrial edition*), 1947, **39**: 1294-9, bibl. 20.
The browning of dried non-sulphited carrot, white potato, onion and sweet potato proceeds in linear fashion until the product has been rendered unpalatable. This relation has been shown to hold over the temperature range 24° to 49° C. for samples stored in air and in nitrogen, and over a moisture range that embraces and extends below commercial levels for these products. In the case of dried sulphited vegetables the browning process deviates from linearity to an extent dependent on the temperature of storage and the sulphite and the moisture contents of the product. Estimated browning rates for dried non-sulphited carrot, white potato, and sweet potato, at the same conditions of temperature and moisture content, are in the ratio of 27 : 3·3 : 1. [From authors' conclusions.]—Western Regional Research Laboratory, U.S.D.A., Albany, Calif.

721. MALLETTE, M. F., AND OTHERS. 664.84.047
Commercial dehydrated vegetables. Further observations on oxidative enzymes and other factors.
Industr. Engng Chem. (*Industrial edition*), 1947, **39**: 1345-8, bibl. 11.
In confirmation of earlier work [*ibid.*, 1946, 38: 437; *H.A.*,

17: 1053], the authors report that a relatively high oxidative enzyme activity in dehydrated cabbage does not influence the rate of deterioration of the stored material as measured by colour, odour, and ascorbic acid changes. Deterioration is greatly affected by the blanching technique; the longest storage life followed a 30 second dip in 0·5% sodium bisulphite solution at room temperature.—Columbia and Cornell Universities.

722. Isaac, W. E., and Winch, N. H. 664.84.65
The guaiacol-hydrogen peroxide and benzidine-hydrogen peroxide colour reactions of the bean (*Phaseolus vulgaris* L.) pod.
J. Pomol., 1947, **23**: 23-37, bibl. 14, illus.

Benzidine can be regarded as an unsuitable indicator of peroxidase in blanching tests of bean pods in the process of dehydration. Guaiacol when applied to bean pod tissues is, in general, also unsuitable for testing the adequacy of blanching, although for some lots it can be used.—Govt. Low Temp. Res. Lab., Capetown.

723. Amerine, M. A., and Winkler, A. J. 663.25
The relative color stability of the wines of certain grape varieties.
Proc. Amer. Soc. hort. Sci. for 1947, 1947, **49**: 183-5, bibl. 2.

Differences are discussed in the colour and colour stability of wines made from Alicante Bouschet, Barbera, Cabernet Sauvignon, Carignane, Charbono, Grand noir, Petite Sirah, Valdepenas, Zinfandel grapes.

724. Lüthi, H. 663.813
Chemische Konservierung von Fruchtsäften? **(The chemical preservation of fruit juices.)**
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 189-94.

The author describes the effect of a number of chemicals on a variety of fruit juices and comes to the conclusion that the problem of chemical preservation has not yet been solved satisfactorily.

725. Lüthi, H. 663.813
Die Lagerung von Fruchtsäften in Steinzeuggefässen. **(The storage of fruit juices in porcelain containers.)**
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 260-2.

As reported earlier (*ibidem*, 1944, 53: 315-8; *H.A.*, 15: 2046), it has proved impracticable to keep non-alcoholic fruit juice sterile in wooden barrels. In the search for more suitable materials several porcelain containers were tested at Wädenswil during the autumn and winter of 1946/47. The juice in these containers remained free of microbial infection and the flavour was not adversely affected. From one of the containers juice was drawn for 9 weeks, but during this time a fungus growth blocked the metal tap. Small-scale producers need a faultless broaching instrument.

726. Lüthi, H. 663.813: 634.1/7
Zur Gefässfrage in der kleingewerblichen und bäuerlichen Süssmosterei. **(The container problem in small-scale fruit juice production.)**
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 369-70.

Two years' experiments with aluminium containers showed that synthetic resin varnishes exist which protect the metal from corrosion and do not affect fruit juices. Aluminium is regarded as another promising material for fruit juice containers. [See also 725.]

727. Moschette, D. S., Hinman, W. F., and Halliday, E. G. 664.85.036+663.813: 577.16
Effect of time and temperature of storage on vitamin content of commercially canned fruits and fruit juices (stored 12 months).
Industr. Engng Chem. (*Industrial edition*), 1947, **39**: 994-9, bibl. 28.

Materials: peaches, pineapple and juice, tomato and juice, grapefruit and juice, and orange juice. Losses in ascorbic acid, thiamine and carotene were not significant at 50° F. and slight at 65° F.; at 80° F. losses were considerable and increased with length of storage. In tomato (but not in tomato juice) niacin decreased with storage at all temperatures. In warehouses in various towns losses of ascorbic acid and thiamine increased with the yearly average temperature.—University of Chicago.

728. Braun, F. 663.813: 634.722+634.23
Über Johannisbeer- und Kirschensäfte. **(Currant and cherry juices.)**
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 176-8.

Several varieties of both fruits were used in this small-scale investigation carried out at Wädenswil. It was found that red currant juices are acceptable only if blended with sweet juices of other fruits. A blend of red currant and apple juice, in one case also of acid cherries as a third ingredient, made a very good drink. Pure cherry juices were tolerable if the more acid varieties were used. The blending of cherry juice with direct producer grape juice proved a great success.

729. Moore, E. L., and others. 663.813: 634.31
An experiment on partial concentration as a means of standardizing low-solids orange juice.
Fruit Prod. J., 1947, **27**: 72-4, bibl. 2.

Cans containing orange juice of 7·43° Brix, juice concentrated to 10·5° Brix, and juice raised to 10·5° Brix by the addition of juice concentrated to 55° Brix, were stored for 6 months at 40° F. and 80° F. They showed no differences in retention of ascorbic acid. Organoleptic tests showed that partial concentration had improved quality of juice stored for 3 months at 80° F.—U.S. Citrus Products Station, Winter Haven, Fla.

730. Gore, H. C. 664.85.31: 663.813
Use of an anion exchange resin in the preparation of syrups from orange and grapefruit juices.
Fruit Prod. J., 1947, **27**: 75-6, bibl. 4.

Fresh strained orange juice with 5% air dry Amberlite resin IR-4B was stirred for 75 minutes at 24° C. Titratable acid was reduced by 80%, ascorbic acid by 20%. The juice was then filtered and boiled to form a clear syrup, well coloured and of a good flavour. Syrup prepared thus from grapefruit juice tasted bitter.

731. D[emmerle], R. L. 663.813
Bittersweet.
Industr. Engng Chem. (*Industrial edition*), 1947, **39**: 7: 14A, 16A.

Sugar syrups may be purified by consecutive passage through cation and anion exchanger beds of synthetic resins; this method is to be used in Hawaii to recover the 10% sugar content from non-potable pineapple juice.

732. Wagner, J. R., Strong, F. M., and Elvehjem, C. A. 664.84.036.5: 577.16
Effect of commercial canning operations on the ascorbic acid, thiamine, riboflavin, and niacin contents of vegetables.
Industr. Engng Chem. (*Industrial edition*), 1947, **39**: 985-90, bibl. 20.
Effects of blanching on the retention of ascorbic acid, thiamine and niacin in vegetables.
ibid., 1947, **39**: 990-3, bibl. 2.

In the commercial canning of asparagus, peas and beans there is considerable loss of the water-soluble vitamins. Most of the loss occurred in blanching, and the least destructive method is a high temperature-short time blanch.—Wisconsin Agricultural Experiment Station.

733. Cruess, W. V. 664.84.31.036.5
Canning of asparagus in California.
Food Manuf., 1947, **22**: 449-54.

An account of the cultivation and processing of asparagus. The peat soils of the delta of the Sacramento and San Joaquin rivers are ideal for growing asparagus. Green

asparagus grown on flat land is cut at the surface of the ground when the stalks are 10-12 in. high; white asparagus is grown under ridges of soft soil and the shoots are cut below the surface just before they emerge. After inspection, cutting and grading, the stalks are canned and sterilized under the control of the State Board of Health. The process is described in detail.

734. GOLDBLITH, S. A., AND HARRIS, R. S. 577.16
Estimation of ascorbic acid in food preparation.
Abstract in *Food*, 1947, **16**: 347.
The dinitrophenylhydrazine reaction is sensitive to some of the oxidation products of ascorbic acid; it should only be used, therefore, to estimate the ascorbic acid content of fresh foodstuffs. It can, however, also be used to estimate the "initial" ascorbic acid content of food after cool storage with oxalic acid.

735. MILLS, M. B., AND ROE, J. H. 577.16: 663.813
A critical study of proposed modifications of the Roe and Kuether method for the determination of ascorbic acid, with further contributions to the chemistry of this procedure.
J. biol. Chem., 1947, **170**: 159-64, bibl. 4.
The authors criticize the modification proposed by Bolomey and Kemmerer, omitting the indispensable thiourea [see *H.A.*, 17: 1066]; they consider that great error is possible when this modification is used for the determination of ascorbic acid in orange juice.—George Washington University.

736. KRAMER, A., AND SMITH, M. H. 664.84.036.5
Effect of duration and temperature of blanch on proximate and mineral composition of certain vegetables.
Industr. Engng Chem. (*Industrial edition*), 1947, **39**: 1007-9, bibl. 7.
Studies were made on the effect of the duration, temperature, and type of blanching on the proximate and mineral composition of peas, green beans, lima beans, and spinach. Steam blanching caused no significant change in the composition of all but spinach, where moderate losses were noted in carbohydrates, ash, and phosphorus contents, and slight gains noted in calcium contents. For the water blanch in general the effect of time was more important than temperature. Carbohydrate losses were most serious in spinach; they reached about 30% of the total found in the unblanched sample, as compared to little over 10% for peas and lima beans, and only about 5% for green beans. Protein losses rarely exceeded 10% for the peas, lima beans, fancy green beans, and spinach, and reached only 5% for the more mature green beans. The mineral constituents were affected in about the same way, but to a greater extent than the carbohydrates; thus, for example, the severest water blanch caused a reduction of 54% in the ash content of spinach. The calcium content of green beans was not affected by the water blanch; that of lima beans slightly increased, and that of peas and spinach increased by as much as 79% and 54% respectively. The phosphorus content of spinach was reduced by as much as 40% but rarely more than 10% for the other vegetables. [Authors' summary.]

737. GUERRANT, N. B., AND OTHERS.
664.84.036: 577.16
Effect of duration and temperature of blanch on vitamin retention by certain vegetables.
Industr. Engng Chem. (*Industrial edition*), 1947, **39**: 1000-7, bibl. 13, being *J. Pap. Pa agric. Exp. Stat.* **1357**.
Materials:—peas, green beans, lima beans and spinach. Brief blanching at high temperature, and blanching in steam rather than in water, favoured the retention of water-soluble vitamins. The practice of blanching successive batches of peas in the same water did not improve the retention of ascorbic acid in later batches.

738. GRANT, W. M. 581.192
Colorimetric determination of sulfur dioxide.
Industr. Engng Chem. (*Analytical edition*), 1947, **19**: 345-6, bibl. 3.
The chromogenic reaction of sulphur dioxide with fuchsin and formaldehyde in acid has been used for the quantitative colorimetric determination of 0 to 10 p.p.m. of SO_2. The method may be applied to fruit after interfering substances have been removed by distillation.

739. DAVIS, W. B. 634.3: 581.192
Determination of flavanones in citrus fruits.
Industr. Engng Chem. (*Analytical edition*), 1947, **19**: 476-8, bibl. 11.
This paper describes a new colorimetric method using alkaline glycol for the determination of the bitter rhamnoglycoside naringin and other flavanones that may be present in grapefruit in particular, as well as in other citrus fruits. Although not specific for naringin, it is a rapid procedure of practical value, which is particularly applicable to the assay of naringin in the juice and colored flavedo of grapefruit, and of hesperidin in other citrus fruits. The possibility of other substances interfering with the method is discussed. Citral, furfural, and geraniol produced color with alkaline diethylene glycol but did not interfere with the method when added to grapefruit juice in quantities larger than those ordinarily found in that juice. An interesting difference between the behaviour of flavanones and flavones in the extracts of certain other plants is pointed out and the suggestion made that the method may be useful in the determination of flavones. The method has been used to determine the distribution of flavanones in the various tissues of citrus fruits and the recovery of pure naringin added to various mixtures, and to follow the course of naringin hydrolysis. [Author's summary.]—Laboratory of Fruit and Vegetable Chemistry, U.S.D.A., Los Angeles, Calif.

740. KING, G. S. 634.3: 581.192
Peripheral deposits of citrus fruit vesicles stained by oil-soluble dyes.
Amer. J. Bot., 1947, **34**: 427-31, bibl. 7.
Peripheral lipoidal deposits occur in the vesicles of several varieties of different citrus fruits. Suberin appears to be one constituent of these deposits.—Bureau of Agricultural and Industrial Chemistry, U.S.D.A., New Orleans.

741. CASS, W. G. 634.11-1.57
Commercial pectins.
Food, 1947, **16**: 332-3, bibl. 10.
The writer reviews recent work in France on the composition and analysis of pectins, particularly those of the apple.

742. MCCREADY, R. M., SHEPHERD, A. D., AND MACLAY, W. D. 634.3-1.57
Use of polymetaphosphates and polyphosphates in the extraction of pectin and pectinic acids from citrus peel.
Fruit Prod. J., 1947, **27**: 36-9, bibl. 11.
The effectiveness of polymetaphosphates and polyphosphates as pectin-extraction aids on citrus peel increases with increase of pH to at least 3·5. Their effectiveness is nil at pH values near 2·0 or lower—conditions known to yield maximum jelly units from citrus peel. Both classes of phosphates are effective in extracting enzymatically de-esterified pectinic acids from citrus peel. Under the reaction conditions investigated, sodium hexametaphosphate is a somewhat more effective extraction aid for pectin than sodium tetraphosphate when compared on an equal-weight basis. This difference is accentuated in the case of enzyme-deesterified pectinic acids. Dry pectins or pectinic acids of low ash content are more readily prepared from solutions

containing sodium tetraphosphate than from those containing sodium hexametaphosphate. The extensive disintegration of citrus peel, which occurs when polymeta- or polyphosphates are used as extraction aids, makes filtration more difficult. [Authors' summary.]—Western Regional Research Laboratory, Albany, Calif.

743. Bottini, O. 664.84: 631.57
Sulla utilizzazione di alcuni cascami dell' industria conserviera. (Utilization of waste products of the preservation industries.)
Ann. Fac. Agrar. Portici, 1942/43, Ser. 3, **14**: 122-37, bibl. 8 [received 1947].
A brief account is given of the steps taken in the establishments of the well-known Cirio preserve manufacturers of Italy to make use of their waste pea, tomato and sugar beet products. Tomato seed flour, pea pods, sugar beet pulp and molasses are by various manipulations combined to form a single concentrated feed for livestock.

744. Anon. 634.651-1.56
Papain extraction.
Rhod. agric. J., 1947, **44**: 244-6, bibl. 4.
A short description of the methods used in different countries for tapping the papaw and drying its latex. Yield figures quoted are: Australia, 1 lb. dried latex per tree per annum; Ceylon, 11½ oz. per tree per annum; S. Africa, 28-165 lb. per acre; Tanganyika, 60-100 lb. per acre per annum.

745. Cruess, W. V. 664.85.63
The role of enzymes in olive processing.
Fruit Prod. J., 1947, **27**: 44-5.
The author's experiments lead him to believe that the oxidase of the olive is not of great importance in the darkening of olives during pickling. Stem end softening of olives held in brine is probably due to pectic enzymes secreted by moulds, whose growth may be controlled by sunlight, ultraviolet light, or by the use of sodium bisulphite.

746. Islip, H. T., and Major, F. 634.31: 633.81
Orange oils from Palestine.
Bull. imp. Inst. Lond., 1947, **45**: 15-17.
A report on 4 samples of oil the constants of which are given.

747. Marsh, T. D., and Kanagaratnam, N. 633.72
China tea manufacturing trials at the Central Experiment Station, Serdang [Malaya].
Malay. agric. J., 1947, **30**: 191-203, bibl. 6.
After some introductory notes on the tea industries of China and Formosa and the classification of tea, the author describes the hand manufacture of China tea and gives an account of the manufacturing trials at Serdang. He concludes that in Malaya the production of medium- and low-grade China teas is possible by hand manufacture, or by the partial use of machinery normally employed in the manufacture of black tea. Furthermore, such grades of China teas can be placed on the local market to sell at competitive prices with similar grades of imported teas.—Dept. of Agriculture, Malayan Union.

748. Lamb, J. 633.72-1.56
Tea manufacture.
Tea Quart., 1947, **19**: 69-72.
The most valuable advance made in recent years has been in understanding the fundamentals of the manufacturing process. The chemistry of tea has been further clarified recently by Bradfield, working in London, who by using a new analytical technique has separated and identified all the main constituents of green leaf. This work links up with the investigations in Ceylon which resulted in identifying the principal enzyme concerned in tea manufacture. In Ceylon the present trend of thought is that the only essential principles of tea manufacture is the exposure of the contents of the cells of the tea leaf to the action of air and enzymes. Investigators have achieved this effect by a direct and thorough crushing of fresh green leaf which it is estimated has instantaneously released 80% of the sap. Under these circumstances fermentation is very rapid, and the whole simple process, including firing, may be completed within two hours of the arrival of green leaf at the factory. The main practical difficulty of this method appears to lie in the processing of the leaf into a form acceptable to the tea trade.—Tea Res. Inst. Ceylon.

749. Jeffrey, R. N. 679.7.021.1
The relation of curing conditions to quality in Burley tobacco.
Bull. Ky agric. Exp. Stat. **496**, 1946, pp. 35, bibl. 4.
A final report on curing experiments extending over 10 years. The author describes methods, equipment and conditions desirable for trials on the curing of leaf and on cured tobacco. Amongst the main conclusions reached are the following: Good quality burley tobacco can be cured at temperatures from 65° F. to 95° F. provided the relative humidity is near optimum, which for curing most burley tobacco is 65% to 70%, and 5% to 10% lower for very large tobacco. The optimum relative humidity for tobacco closely spaced in the barn is also 5% to 10% lower than for tobacco of normal spacing. Burley tobacco cured at too high a relative humidity is darker than if cured at optimum conditions and a lower yield is obtained. A loss in total value of about 10% may be expected at 75% to 80% relative humidity and a loss of 25% to 60% at 80% to 85% relative humidity. Burley tobacco cured at too low a relative humidity tends to be mottled, with yellow areas predominant at medium temperatures, and red areas predominant at high temperatures. Maintenance of the same average conditions throughout the curing period results in better quality tobacco than that obtained by changing the average conditions during curing. No evidence of difference in quality has been obtained resulting from a diurnal fluctuation, such as normally occurs in the barn. Split tobacco is more susceptible to injury by low humidity. Tobacco which is not split, and so does not lose moisture so readily, is more susceptible to injury by high humidity. Cured tobacco should not be exposed to a relative humidity above 75% for longer than necessary to bring the tobacco into case for stripping. The moisture content of cured burley tobacco rises slowly as the relative humidity is increased up to about 70%. From this point on toward higher humidities, the moisture content rises at an increasing rate. Temperature does not appear to have any significant effect on the moisture content of the tobacco so long as the relative humidity remains constant.

750. Askew, H. O., and Blick, R. T. J. 633.71
Flue-cured tobacco. II. Development in sugars in leaf during curing.
N.Z. J. Sci. Tech., 1947, **28**, Sec. A, pp. 338-44, bibl. 7.
During the flue-curing of tobacco leaf there is a rapid production of reducing sugars, mainly glucose, together with small amounts of sucrose by hydrolysis of starch and possibly other carbohydrates. After the colouring stage, change in the sugar content is small. For the whole leaf up to nearly 26% of total sugars on the dry basis, of which 20% was glucose, have been found. The blade of the leaf contains more sugar than the midrib. [From authors' summary.]

751. B[ray], G. T. 633.71: 633.85
Tobacco seed oil.
Bull. imp. Inst. Lond., 1947, **45**: 24.
Tobacco seed contains 33-43% oil. The edible grades of this oil are non-toxic and have a digestibility and nutritional value equal to those of the usual edible oils. In tobacco-producing countries there is often a surplus of seed.

752. GUNSTONE, F. D., HILDITCH, T. P., AND RILEY, J. P. 633.85
African drying oils. I. The seed oil of *Tetracarpidium conophorum*.
J. Soc. chem. Ind., Lond., 1947, **66**: 293-6, bibl. 4.
Tetracarpidium conophorum is a perennial vine commonly cultivated in southern Nigeria for its edible nuts; these contain a drying oil superior to linseed oil. To secure an oil of low acidity the seeds must be heated to 100° C. immediately after harvesting to destroy the unusually active lipolytic enzymes. Commercial development should be possible.—University of Liverpool.

753. NEWTON, E. B., STEWART, W. D., AND WILLSON, E. A. 663.912: 631.562.4
Crude rubber preparation.
Industr. Engng Chem. (*Industrial edition*), 1947, **39**: 978-84, bibl. 25.
Hevea latex, acidified to pH 4·5 to 4·9 can be coagulated in a few minutes by the addition of coalescence accelerators: straight-chain saturated fatty acids with 10-14 C atoms, certain phenols and some of the higher fatty alcohols may be used. Sheet rubber may be produced continuously by discharging latex plus accelerator and coagulant on to a properly shaped conveyor belt, from which the strip of coagulum may be fed into a sheeting battery. A pilot plant is described.—B. F. Goodrich Company's Malayan Research Laboratories.

Noted

754.

a ANON. 634.1/8-1.57
Fallobst, Mostbirnen und Obsttrester mildern die Futternot in den Trockengebieten. (**Windfalls, perry pears and dried fruit-residue as feeding stuffs.**)
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 347-9.

b BAMERT, W. 664.85.13.047
Erfahrungen eines Dörrers auf dem Gebiete der Birnentrocknerei. (**Pear drying.**)
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 332-4.

c CRUESS, W. V., AND KILBUCK, J. H. 663.25
Pectic enzymes in wine making.
Abstract in *Food*, 1947, **16**: 346.

d CURL, A. L. 663.813: 634.3
Comparison of several types of apparatus devised for the determination of volatile oil in citrus juice.
J. Ass. off. agric. Chem. Wash., 1947, **30**: 567-75, bibl. 7.

e DUNN, H. C., AND HILDITCH, T. P. 633.85
Notes on the component acids of West Indian ben [*Moringa oleifera*] and mango seed oils.
J. Soc. chem. Ind. Lond., 1947, **66**: 209-11, bibl. 5.

f GUNSTONE, F. D., AND HILDITCH, T. P. 633.85
The component acids and glycerides of Australian lumbang oil [*Aleurites moluccana*].
J. Soc. chem. Ind. Lond., 1947, **66**: 205-8, bibl. 8.

g HARTMANN, A. 664.85.13.047 + 663.813
Dörrbirnen und Birnendicksäfte sind wertvolle und preiswürdige Nahrungsmittel. (**The nutritive value of dried pears and pear juice concentrates.**)
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 350-2.

h HUBER, H. 663.39
Wie stellen wir einen guten, gesunden Obstwein her? (**The manufacture of a good, sound fruit wine.**)
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 323-5.

i LEWIS, V. M., AND MCKENZIE, H. A. 663.813: 634.31
Amperometric determination of dissolved oxygen in orange juice.
Industr. Engng Chem. (*Analytical edition*), 1947, **19**: 643-6, bibl. 21.

j LÜTHI, H. 663.39
Bessere Obstweine durch Reinhefegärung. (**Better fruit wines by pure yeast fermentation.**)
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 326-7.

k MACKINNEY, G., AND FRATZKE, W. E. 664.84.13.047
Carotenoids of stored dehydrated carrots.
Industr. Engng Chem. (*Analytical edition*), 1947, **19**: 614-5, bibl. 6.

l MCKENZIE, H. A. 664.8.036.5
The corrosion of tinplate food containers.
Fd Pres. Quart., 1947, **7**: 15-17, bibl. 11.

m ORENT-KEILES, E., HEWSTON, E. M., AND BUTLER, L. I. 613.12: 635.1/7
Vitamin and mineral values of vegetables as served in an Army mess.
Misc. Publ. U.S. Dep. Agric. **632**, 1947, pp. 18, bibl. 24.

n PEYER, E., AND OTHERS. 663.25
Säureabbau und künstliche Entsäuerung der Weine und Traubenmoste. (**Acid decomposition and artificial deacidification in wines and grape musts.**)
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 281-5, 289-95, being *Flugschr. Eidg. Versuchsanst. Obst, Wein u. Gartenb., Wädenswil*, **23**.

o RENTSCHLER, H. 663.25 + 663.39
Über die Verwendung von Aktivkohlen bei der Getränkebehandlung. (**The use of activated charcoal in the treatment of grape wines and fruit wines.**)
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 211-3.

p RENTSCHLER, H. 663.39
Welche Bedeutung hat die schweflige Säure für die Gesunderhaltung der Obstweine? (**The significance of SO_2 for keeping fruit wines in good condition.**)
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 327-9.

q TAVERNIER, J., AND JACQUIN, P. 663.34
Manufacture of perry; recent work in France.
Food, 1948, **17**: 24.
Summary of a paper in *Chim. et Ind.*, 1947, 58: 135-9.

r WEIER, E. 664.84.13.047
Rate of pigment degradation in the phloem of dehydrated red core chantenay carrots.
Hilgardia, 1947, **17**: 485-500, bibl. 13.

s ZÜLLIG, E. 663.813
Die Mosterei in Frankreich. (**The production of fruit wines and fruit juices in France.**)
Schweiz. Z. Obst- u. Weinb., 1947, **56**: 309-13, 335-8.

NOTES ON BOOKS AND REPORTS.

755. Biles, R. E. 635.1/9
The complete book of garden magic.
Herbert Jenkins, London, S.W., 1947, pp. 334, 21s.

As a birthday present for an industrious, rich aunt with a tendency to gardening nothing could be better than this profusely illustrated and highly informative book. It is crammed full of useful and fascinating titbits of information. That it is written primarily for American conditions does not appreciably detract from its value. But, though it is evidently based on scientific knowledge and practice, its extremely detailed instructions might prove somewhat irritating to the tetchy scientist.

756. Copeland, E. B. 583.5
Genera Filicum—the genera of ferns.
The Chronica Botanica Co., Waltham, Mass. (Wm. Dawson & Sons Ltd., London), 1947, pp. 247, 10 plates, $6.00.

The present volume is the fifth in the series *Annales Cryptogamici et Phytopathologici* of the Chronica Botanica Co. The graceful habit of growth of ferns, their decorative foliage and their interesting life history and mode of reproduction give them a special attraction for the "pure" botanist and those who are particularly interested in ornamental plants. After an introduction dealing with the history of study on ferns the book is purely one of systematism, consisting of descriptions of families and genera with notes on certain species. The culture of ferns does not come within its scope and cultivated forms take their natural place among the rest with no special reference to their horticultural value. The book will prove a valuable addition to botanical libraries, and those workers or amateurs who are particularly interested in ferns will doubtless want to acquire it for themselves as a ready source of information.

757. Crane, M. B., and Lawrence, W. J. C. 634/635: 575.1
*The genetics of garden plants.**
Macmillan & Co. Ltd., London, 3rd edition, 1947, pp. 299, illustrated, bibl. 421, 16s.

This book provides a very readable introduction to genetics and cytology enabling the reader to cross the threshold unconfused. The layman's difficulties are reduced by the clear presentation, and he is helped by the glossary. Although the times have been troubled, the results of much research have been published since the second edition appeared in 1938; recent research, including unpublished work of the authors and their colleagues at the John Innes Horticultural Institution, has been taken into account in this revision, which devotes a new chapter to xenia. Examples taken from the whole field of horticulture are used to illustrate the parallelism in the results and conclusions of the systematist, the geneticist, and the cytologist. The sceptic, who can swallow Mendel's peas but is choked by the genetically unpredictable apple, may be helped by the satisfying synthesis of the three approaches to the study of variability and heredity. Cytological knowledge makes it easy to understand why simple mendelian ratios are unlikely to appear in the progeny of the apple, with its duplicated chromosomes, and why triploid varieties make unsatisfactory parents. General textbooks of biology illustrate the principles of genetics with a few simple examples, giving the student the impression that it is all very easy; the massive tomes about the breeding behaviour of *Drosophila melanogaster* leave him confused and uncertain of its bearing upon practical issues. Between these classes, this book should be of as great value to the teacher as it is to the grower or gardener, for throughout the practical aspects of genetics are emphasized. G.K.G.C.

* For review of first edition, see *H.A.*, 5: 158.

758. Fanelli, L. 634.55(457.5)
Varietà pugliesi di mandorle. **(Almond varieties of Apulia.)**
Stazione Agraria Sperimentale, Bari, 1939, pp. 235 and 92 page plates [received 1947].

Four years work of the Almond Improvement Committee led to the discovery in Apulia of 367 separate almond varieties. Of these the flowers, leaves and nuts of 50 are described in detail in this monograph and notes are made of the idiosyncrasies of each variety. Among them are the well-known varieties Fragiulio, Santoro, Rachele, Montrose, Tuono, and Catuccia.

759. Frear, D. E. H. 632.951+632.952
A catalogue of insecticides and fungicides. Vol. I. Chemical insecticides.
Chronica Botanica Co., Waltham, Mass., U.S.A. Wm. Dawson & Sons Ltd., London, 1947, pp. 203, $6.50.

In this catalogue of chemical compounds a novel means of classification has been adopted which enables the user to locate any compound listed with ease and speed. An indication of the degree of toxicity of the substance to the test insect is given, together with reference numbers which enable the sources of the information to be traced. The volume should prove of value to research workers concerned with pest control. J.K.E.

760. Garner, R. J. 631.541: 634.1/7
The grafter's handbook.
Faber & Faber, London, 1947, pp. 223, 24 pl., 94 text figs., bibl. 101, 15s.

Unworthy persons misled by its title to hope that *The Grafter's Handbook* may prove to be a child's guide to the Black Market appearing opportunely at Christmas, will not be interested further.

The Grafter's Handbook is purely horticultural, and double working is the only kind of double dealing referred to in its simple pages. Simple because the author seems to have the gift of making all things plain, even the most alarmingly complicated graft techniques, with a lucid brevity of expression that inspires confidence. The learner feels he could go out and do it now. Not that he would be allowed to, for the author has no belief in rushing a job. Those who want to graft must first learn the whys and wherefores. Thus preparatory chapters are devoted to the study of plant structure and its bearing on the union of stock and scion, the mysteries of incompatibility and the workings of the cambium. Turning from theory to practice the collection and treatment of scion wood of various kinds is discussed and the many methods of raising stocks on which to implant them, with special reference to fruit trees. Grafting tools are dealt with very thoroughly, the author revealing something of the collector's zeal in his descriptions and illustrations of grafting knives from many lands. Chisels, saws and secateurs are noticed, hints being given on the most suitable types. Useful recipes are given for various graft seals and waxes and a portable wax heater is described and illustrated.

Now at last the learner can take his knife in hand (and a quantity of accessory impedimenta) and try for himself some of the innumerable techniques so clearly described and illustrated. The fact that the many line illustrations are of Mr. Garner's own drawing is an asset of some value since it enables him to reinforce his descriptions to a point that should render misunderstanding impossible. Into this chapter, the core of the book and the reason for its existence, the author has, so to speak, put all he knows of graft techniques, and since he knows a very great deal and all of it at first hand, he has provided horticulturists with a miniature encyclopedia on a subject whose modern ramifications have

never before been so comprehensively brought together within a single cover.

The concluding chapters show how what has been learned may be applied in the field to the raising of trees in nurseries and the grafting of old established trees for conversion or repair. There is a good bibliography and two useful appendices listing compatible plum rootstocks and scions, and varieties of pears that respond best to double working.

G.St.C.F.

761. MORRIS, T. N. 664.8.047
The dehydration of food.
Chapman & Hall Ltd., London, 1947, pp. 172, figs. 30, tables 19, bibl. many, 15s.

This work, which refers specially to wartime developments in the United Kingdom, aims at presenting, primarily for the food technologist, the scientific principles underlying the dehydration of vegetables, meat, fish, eggs and milk. The author writes with the advantage of being a member of the Low Temperature Research Station, Cambridge, where much of the investigation associated with wartime dehydration was carried out. The relative merits of dehydration, canning and refrigeration are considered as regards culinary quality and nutritive value, ease of handling and transport, storage life, and convenience to consumer, though the question of cost is excluded. The author considers that dehydration is, beyond dispute, a reliable and useful alternative to canning, but no exaggerated claims are made. He notes as disadvantages of dehydration the relative monotony of form in which the reconstituted food is presented, and the need for further preparation prior to use. The prejudice which exists in some quarters against dehydrated foods is attributed to part of the earlier wartime production being incorrectly processed. Contributory reasons, the reviewer would suggest, were exaggerated conceptions of the keeping qualities of dehydrated products under unfavourable conditions, and lack of experience on the part of those responsible for preparation of the products for consumption.

On the technique of dehydration consideration is given to the preparation of material for dehydration, preliminary processing including scalding, types of driers (tunnel, cabinet, spray and drum driers, vacuum and freeze-drying), compression into blocks and methods of packing. On the vegetable side, information is given on the preparation of mashed potato powder in addition to the older forms of dehydrated potato. Reference is made also to the compounded dried foods made up in block or tablet form for issue as special rations (e.g. egg and meat for omelettes, oatmeal and milk for porridge, etc.), while the storage life of dehydrated products is considered in relation to method of processing, moisture content, type of packing, and temperature of storage. Laboratory tests for establishing the quality of the dried foods are described, and attention given to bacteriological aspects and precautions against insect infestation.

The book is reasonably free of misprints, though on p. 164 three spellings of the name of a well-known pathogenic organism occur in as many lines. The term "moisture content" is used for some products, "water content" for others, though this duality of terms seems scarcely necessary. On p. 66 it is indicated that the addition of sulphite effects little improvement in the quality of dehydrated potato, but on p. 144 it is stated that sulphite should be present in the product. The directions for culinary test on potato refer to "slices" where the intention is probably "strips", and also in connexion with this test some reference to the important effect of the type of water used for cooking might have been added. There are inconsistencies in the presentation of references, titles being included in some instances, but not in others, and also in the use of italics for the proper names of various organisms. These, however, may be regarded as minor blemishes in a clearly-written account which easily achieves its object of presenting, adequately documented but unencumbered by excessive detail, the principles underlying dehydration. A study of this work, together with Ministry of Food publications (to which Mr. Morris refers) giving more details concerning factory operation, would provide a useful introduction to anyone proposing to take a serious interest in dehydration. G.B.

762. NATIVIDADE, J. V. 634(649)
Fomento da fruticultura na Madeira. **(The encouragement of fruit growing in Madeira.)**
Junta Nacional das Frutas Madeira, 1947, pp. 177.

On opening this account of the author's visit to Madeira one is struck by the excellent photographs, which give a comprehensive picture of the topography and climate of the island; many are taken in situations inaccessible to the voyager whose ship lies off Funchal for a few hours. Much space is devoted to a description of the various fruit-growing zones of the island, whose precipitous nature provides climates where fruits of the tropics thrive a few miles from orchards of apples and pears. Of the tropical fruits exported, the banana, *Musa nana*, is the most important; avocado pears, cherimoyers (of which Madeira possesses some excellent types), passion fruit and mango are also exported. Pears and apples exist in great variety in small orchards, and in some localities peaches, plums and cherries flourish. Figs are grown at altitudes between 200 and 400 m. above sea level, and in parts of the coast the various citrus fruits have recently been planted. Although Madeira is better known for its wine, grapes are also exported. Cultural methods and varieties now grown are described in some detail. After outlining such difficulties as the system of land tenure, the pests and the excess or shortage of water, the author makes recommendations for the stimulation of fruit growing; not least important is the establishment of a fruit research station in Madeira. The neighbouring island of Porto Santo, "the poor child of a rich mother", is also described. Water is an even greater problem there, the people are apathetic, and the best vineyards may soon be replaced by an airfield.

763. NILOV, V. I. (Editor). 581.1
Biochemistry and physiology of tropical and subtropical trees and shrubs. [Russian.]
(*Bull.*) *The Lenin All Union Acad. agric. Sci., Molotov State Nikita Bot. Gard.*, 1939, Vol. **21**, No. 2, pp. 176, Moscow [received 1947].

This brochure comprises 6 articles by various authors, viz.

(1) NILOV, V. I., NESTERENKO, P. A., AND MIHELJSON. 581.192: 633.85
Changes in the chemical composition of plants in crossing, pp. 3-28, bibl. 13.
Data presented regarding the essential oils of basil, *Ocimum canum* Sims, *O. pilosum* Willd., and their hybrids.

(2) KNISEVECKAJA, T. I. 633.85: 581.192
The composition of the essential oil of basil hybrids, pp. 29-36, bibl. 2.
An analysis of the essential oils of eight plants of the cross *Ocimum* sp. No. 49 × *O. canum*.

(3) NILOV, V. I., PAVLENKO, O. N., AND LAPINA, E. P. 581.192: 581.144.4
Some biochemical characters of plant leaves, pp. 37-62, bibl. 25.
A study of the hydrolytic activity of amylase and the action of peroxidase and catalase in leaves at different level; data are presented for peach and *Ailanthus*.

(4) EREMEEV, G. N. 634.1/7-2.112
Diagnosing drought resistance in fruit trees, pp. 63-110, bibl. 71.
The variation in drought resistance in leaves of different varieties of peach, almond, olive, pear, apple, etc., was investigated. To obtain drought

resistant plants it is necessary that both components, stock and scion, should be resistant to dry conditions. In assessing the degree of drought resistance of various plants field observations should be supplemented by a study of the behaviour of cut off shoots. Great variation in the reaction to dry conditions was shown by the leaves of different varieties. This is associated with the reaction of the stomata in dry air, such reactions being modified by the position of the leaves on the shoots, soil conditions and size of crop.

(5) Sokolova, N. F. 632.112: 634.25 + 634.55
Resistance of peach and almond to low temperatures, pp. 111-44, bibl. 39.
Resistance to low temperature increases rapidly between 20 October and 20 November. The rise in resistance in autumn is closely bound up with the dry weight of the buds, in relation to the inflow of carbohydrates. Temperatures during the resting period are important; the most favourable are those a little above 0° C. Temperatures of +18° C. or +20° C. during the dormant period do not afford conditions for complete dormancy and the buds, not being subject to low enough temperatures, fail to grow. Extending the period of rest is important in the southern regions of U.S.S.R., and varieties with long hibernating periods are less liable to damage from low temperatures during the second half of winter.

(6) Dvornikov, V. C. 634.55
Prussic acid content in almonds and methods of estimating it for sorting out the bitter almond forms before they come into bearing, pp. 145-76, bibl. 10.
An investigation of the distribution and amounts of HCN in the tissues of sweet and of bitter almonds showed that the acid is more concentrated in the leaves of the upper shoots, those of the bitter almonds containing considerably more than sweet almond leaves. This indicates a method for eliminating bitter forms from among seedling plants.

764. Rehder, A. 635.976 + 635.977
Manual of cultivated trees and shrubs.
Macmillan, N. York, 2nd edition, 1947, pp. 996, 42s.
The purpose of the first (1927) edition of this extremely compact flora was to present a systematic and descriptive enumeration of the cultivated trees and shrubs hardy in North America, exclusive of the sub-tropical and warm-temperate regions, and to facilitate their identification by analytical keys. It was revised in a second edition in 1940 and this was reprinted in 1947. It is very strongly recommended for reference work.

765. Willis, L. G. 631.811.9: 016
Bibliography of references to the literature on the minor elements and their relation to plant and animal nutrition.
6th supplement to 3rd edit., 1945, pp. 103; 7th supplement to 3rd edit., 1947, pp. 121, Chilean Nitrate Educational Bureau Inc., 120 Broadway, N. York.
These supplements have four indices: general, author, botanical, and animal nutrition.

766. Aalsmeer, 635.9
Jaarverslag Proefluin voor de Bloementeelt te Aalsmeer over 1946. **(A.R. of the Aalsmeer Res. Stat. for flower culture 1946.)** Aalsmeer, 1947, pp. 108.
As in previous years this report for 1946 comprises a number of short articles by various members of the staff on experiments and trials under way on about thirty ornamental plants, all herbaceous except the rose and *Prunus triloba plena*. With regard to the last mentioned G. S. v. Marle gives an account of the stem-boring caterpillar of the moth *Grapholitha woeberiana*, and its successful control with Gesarol.

767. Cawthron Institute. 634/635(931)
Annual Report of the Cawthron Institute 1946-47, 1947, 43 pp.
Subjects of interest to the horticulturist appear under the headings: *Mineral Deficiency Investigations.* Analyses of apple leaves, made to determine their magnesium and potassium content, showed that on the better trees the leaves contained approximately twice as much magnesium as those on the untreated trees. In plant tissue tests the great variations found from plant to plant show that before these methods can be used in fertilizer and nutritional studies much work remains to be done on sampling methods in comparative fertilizer and cultural trials. A marked chlorosis appeared on the leaves of tops and side shoots of tomato plants on unsterilized and on formalin-treated plots, but not on steam-sterilized or chloropicrin-treated plots. Painting the leaves with a 0·25% solution of ferrous sulphate gave some improvement in colour, but not with manganese sulphate at the same concentration. *Fruit Research.* Epsom salts have not given such uniformly good results as magnesium carbonate or ground dolomite with apple trees showing leaf scorch from magnesium deficiency. Ground dolomite at 12 lb. per tree was effective in preventing defoliation and leaf scorch. In long term orchard manurial trials trees with complete fertilizer (NPK) are outstanding in growth and yield; those treated with P and K only come next in order. There is some evidence that deficiencies of minor elements other than boron and magnesium are having detrimental effects in certain orchards. In two Blenheim orchards apparent benefit followed painting the leaves with solutions containing iron, manganese and zinc. Tests of Double Vigour (French crab vegetatively propagated) for the Statesman variety of apple continue to show to advantage over Northern Spy Stock. Tests with a vegetatively propagated stock derived from the Epp's variety has given much greater growth with Cox's Orange and Jonathan than Northern Spy. Work on fruit diseases has included the effect of penicillin on fungi (it retarded the growth of certain fruit-rotting fungi), the value of Elgetol for apple scab control and the time of scab ascospore maturity. In a raspberry investigation a complete fertilizer was more satisfactory than blood and bone, in the first year of application. In another trial no response was obtained from magnesium compounds, but borax at 28 lb. per acre brought about improved cane and leaf growth. *Tomato investigations.* Tests on old glasshouse soil showed the great value of both steam and chloropicrin in improving the growth and yield of tomatoes, the yield being improved by at least 3 lb. per plant. On new glasshouse soil chloropicrin was again outstanding in increasing growth and yield. The addition of charcoal and cocoa bean husks to Nelson tomato soil resulted in increased yield. The heaviest watering again gave the highest yield. "Cloud" was least in unsterilized plots; steam sterilization, the use of compost, or cocoa bean husks tended to raise the percentage of "cloud". The value of chloropicrin for outdoor tomato soil was confirmed. The use of chloropicrin, sheep manure and cocoa bean husks reduced "hard-core". *Tobacco research* includes biochemical and physiological studies and work on diseases (mosaic, black root rot, verticillium wilt and collar rot). *Entomological investigations.* Mealybugs have been collected with the object of selecting parasites which will be most useful against New Zealand mealybugs.

768. Cheshunt. 631.544
Thirty-second Annual Report of Cheshunt Experimental and Research Station 1946, 1947, pp. 76.
Tomatoes: Manurial trials with tomatoes over 7 years show that under Cheshunt conditions sulphate of potash can be

replaced by muriate of potash in time of necessity. Variety trials were concerned with finding varieties most likely to suit post-war conditions. *Cucumbers:* 8 varieties were tested in the first trials since 1939. None proved more suitable than the old favourites, Butcher's Disease Resister and Rochford's Market. *Lettuce:* Cheshunt Early Giant, a short-day variety, is still the best for heated glasshouses during autumn and winter. The attention of growers is invited to Cheshunt Early Ball, a variety for cold houses, cold frames and cloches. This variety can be left uncut for 6 weeks after it is ready without risk of bolting. It was not found possible to distribute seed of the new and promising varieties 5a and 5b (Cheshunt Early Giant × Green Frame). *Mushrooms:* a summary is given of some cultivation experiments. An unsuccessful attempt was made to prepare straw compost that would compare favourably with composted horse manure. *Plant diseases:* The results of studies of *Verticillium* wilts on tomatoes and cucumbers are reported. Soil treatment with 8-hydroxyquinoline sulphate did not prevent the development of *Verticillium albo-atrum, V. dahliae* and *Fusarium bulbigenum* var. *lycopersici.* Accounts are given of 2 diseases caused by *Pythium* spp., one in *Primula obconica* and the other in young tomato plants. Investigations of *Didymella lycopersici* stemrot in tomatoes were continued. Ethyl mercuric phosphate was found to be an effective fungicide for treating soil before planting. No control of existing infections was obtained. *Didymella* was found to penetrate to a depth of 3 in. in culture tubes of sterilized soil, but only to a depth of ½ in. in unsterilized soil. Glucose added to infected soil greatly increased the number of plants in the soil infested with *Didymella.* The influence of soil conditions on the susceptibility of tomatoes to mosaic viruses was further investigated. The investigation of antibiotic substances, including clavatin from two sources, in relation to the control of soil-borne diseases was continued. *Pests:* Good control of red spider mite was obtained on some plants using azobenzene. In spraying experiments with tomatoes infested with white fly a suspension of DDT of 1 : 2,000 was more destructive to the scale stages up to the 3rd instar than an emulsion of 1 : 1,000. The adult flies were killed by both suspension and emulsion at 1 : 4,000. DDT was also used in experiments on the control of the cucumber-house woodlouse. Some growers remove the cotyledons of tomato seedlings in an attempt to control tomato leaf miner. Experiments indicated that cotyledons cannot be removed without risk to plant growth until a minimum of 14 days after germination. A good measure of control of root eelworm (*Heterodera marioni*) was obtained by the use of DD mixture (*dichloropropane* and *dichloropropene*). *Chemical investigations:* The residual effects following the addition of sulphur and H_2SO_4 to tomato soil were studied. Beta-naphthoxyacetic was used with beneficial effect on the setting of tomato fruits in commercial nurseries. The early promise of α-2: 4-dichlorophenoxypropionic acid was not confirmed in practice. It was not possible to reproduce the results claimed for 2: 3: 5 tri-iodobenzoic acid, said to induce flowering and flower trusses instead of vegetative shoots in tomatoes. Deficiency experiments with carnations were continued and extended. Magnesium and potassium deficiencies in chrysanthemums in commercial nurseries were observed for the first time. Work on the relative merits of different extractants for the estimation of available potash and phosphate in the soil was extended to include the uptake of these nutrients by the plant. Experiments were begun to determine the rates at which organic nitrogenous fertilizers generate nitrate.

769. C.S.I.R., AUSTRALIA. 633/635+664.84/85(94)
Twentieth Annual Report, Council for Scientific and Industrial Research, Australia, for year ended 30th June, 1946, 1947, pp. 127, 5s. 4d.

Plant investigations. Weeds: The results of tests with hormone and other sprays are reported. In this connexion a simple method was devised for identifying dead and living tissue in the field, using a portable electrical resistance apparatus. *Fruit:* Rootstock investigations continued. Additional types of apple rootstocks reported to be immune to woolly aphis were obtained for testing. Good results were reported in tests of D-D (dichloroethylene and dichloroethane) for controlling woolly aphis in stool beds. Williams Bon Chretien pear on *Pyrus calleryana* produced better and larger trees than on Malling B1, C7, D3 and D4. *Drug plants:* The study of *Duboisia* spp. and *Papaver somniferum* and the search for pharmacological and insecticidal substances in native plants continued. *Vegetables:* Studies of variation make it apparent that in the genetically unstable cross-pollinated crops, viz. cabbage, red beet, carrot and onion, selection for seed should be " intensive " and made from high-quality commercial crops growing in the environment in which the selections are to be planted. Seven varieties of potato showed sufficient resistance to common scab (*Actinomyces scabies*) for breeding purposes. The tomato Pan America proved outstanding in being resistant to *Fusarium* wilt in glasshouse and field. Further work on the protective inoculation of the tomato against spotted wilt confirmed the previous observation that the protection afforded by the mild strain of the virus is of too short duration to be of use in the field.

Entomological investigations. Much of the work reported is of interest to horticulturists, particularly the biological control of weeds and insect pests and tests of DDT against the oriental peach moth, the codling moth, red spider and mite, the potato moth, the cabbage moth, the cabbage aphis and various insect vectors of plant viruses.

Irrigation Settlement investigations. Work at the Commonwealth Research Station, Merbein, Victoria, showed that chlorotic currant vines can usually be cured or improved by swabbing all pruning or cincturing cuts with a 20% solution of ferrous sulphate. Trials suggest that it may be possible to complete the drying of some fruits by means of infra-red heating. In irrigation trials with tomatoes plants watered at weekly intervals were consistently inferior to those irrigated at intervals of 3 weeks. From the Irrigation Research Station, Griffith, N.S.W., come reports on investigations into: methods of irrigating fruit trees and vegetables; waterlogging and salting in the Murrumbidgee Irrigation Area; and the value of a cultivated and irrigated spring fallow for vegetables. *Food preservation investigations.* Investigations reported include: studies of the organization and respiration of the plant cell in relation to storage; skin coatings for apples in storage; orchard variation in relation to storage of apples; the use of Pliofilm wraps, stretched wraps and case liners compared with a standard wax treatment for citrus; vegetable and fruit canning methods, the heat-treatment and deaeration of canned orange juice, the loss of vitamin C during the storage of fruit spreads and some problems in the dehydration of fruits and vegetables. *Rubber.* Investigations of growth development and rubber accumulation in guayule continued. *Oenological research.* Sherry: investigations were concerned with the factors influencing the changes brought about by the sherry yeasts. Sweet wine: research was begun into the relationship between the stage of ripeness of grapes at harvest and the quality of the resulting wines.

770. D.S.I.R., NEW ZEALAND. 633/635(931)
Twenty-first Annual Report of the Department of Scientific and Industrial Research, New Zealand, 1947, 84 pp., 1s. 9d.

Items of horticultural interest are included under the following headings: *Fruit Cold Storage Research.* Granny Smith apple variety is less susceptible to core-flush worked on M. XII than on Northern Spy. Severe deep scald in Jonathan apples induced by continuous storage at 30° F., and particularly at 32° F., was greatly lessened by initial periods at higher temperatures. The storage of Delicious was unaffected by rootstock but M. I was rather better than

M. XII, M. XV or Northern Spy for Granny Smith and very much better for Cox's Orange. M. XII was the best rootstock for Jonathan. Pliofilm and diphenyl-impregnated wraps reduced the incidence of rots in transported oranges. *Fruit Research.* In manurial investigations on apples the initial importance of nitrogenous fertilizer and the still greater significance of the necessity for phosphate and potash in addition have again been shown. In rootstock trials with the varieties Jonathan, Red Delicious and Granny Smith the rootstock M. XII has given maximum growth, with M. XV only a little inferior. With Cox's Orange M. XV gave slightly better growth than M. XII. Northern Spy is intermediate and M. I semi-dwarfing. In yield Northern Spy still leads, except with Jonathan, for which M. XII maintains its superiority. Sturmer scions on Sturmer rootstocks have made better growth than on any other rootstock. Gravenstein on Gravenstein rootstocks has produced sturdier trees and was almost as early in bearing as on Northern Spy. Delicious trees are larger when worked on Delicious stocks than on Northern Spy, but fruiting is much delayed. In citrus trials with Lisbon Lemon the largest trees with heaviest yield developed on citronelle stock. In apple variety trials Laxton's Epicure, Laxton's Exquisite and Ellison's Orange Monarch have been outstanding in quality and yield. Plant disease investigations covered a number of subjects. Bordeaux mixture (1-2-50) alone gave adequate control of bacterial spot of plum. Apple mosaic proved to be caused by a bud-transmitted virus. Shell-back of lemons was found to be due to *Diaporthe citri*, hitherto obtained only from stem-rot of fruits. A high degree of control of apple scab has been obtained with Phygon. Gammexane at several dosages gave almost complete control of woolly aphis in three research orchards. The proprietary Selocide gave almost complete control of red mites on apple trees, Dynome being less effective.

Tobacco Research. In a trial of varieties, Harrison's Special 215 maintained its position as a high yielding variety. It was equalled in yield by Special 400, a variety introduced from the United States. These two varieties and Special 401 showed fair resistance when grown on land infected with the black root-rot diseases [*Thielaviopsis*]. Treatment with steam again proved the most satisfactory method for the control of weeds and for stimulating the growth of plants in the seedling beds. A calcium cyanamide-urea mixture closely approached steam for the control of weeds and was greatly superior to other chemicals tried.

771. I.N.E.A.C. 633/634(675)
Rapport pour les exercices 1944 et 1945. **(Report on experimental work of I.N.E.A.C. stations, 1944 and 1945.)**
Institut national pour l'étude agronomique du Congo belge, Brussels, 1947, pp. 191, 80 fr.

Since the report for 1942 and 1943 was published in Leopoldville, the links between Belgium and the Congo have been restored and the recruitment of fresh staff has led to the expansion of work at the Congo stations. It is proposed that I.N.E.A.C. should take over the running of the station of the Comité Special du Katanga at Keyberg, and open three new stations. The Agronomic Research Section contributes numerous tables of yield data. Some indication of the scope of this report is given by the following notes:— *Oil palm.*—Yields are improved by organic manure, depressed by rock phosphate. Interplanting with coffee does not seem harmful. In the early years intercropping with food plants is beneficial. Over 4,000 crosses were made in 1945, and all seed now issued is from *tenera*×*dura* or *dura*×*pisifera*. *Coffee.*—Two self-fertile clones produced 5 kg. of berries per tree, although in the majority of clones yield is halved by self-pollination, and some are self-sterile. Hevea and local and introduced trees are being used for shading coffee. *Cacao.*—A good burn after clearing favours the growth of young cacao. Certain [unspecified] forest trees seem to harm cacao; clear felling is recommended. Close planting, at 2 m.×3 m., gives the best results in the early years; yields over 300 kg./ha. of dry cacao are reported in the fifth year at Yangambi. *Hevea.*—Most of the work reported concerns the selection of new clones; many clones from the Far East are in cultivation. In the trial of tapping systems, those more intensive than S/2 d/2 have had to be abandoned; TJ 16 was outstanding in this trial and it was followed by BD 5. Plants grafted in the field grew more rapidly than those grafted in the nursery. In 1945 Yangambi issued more than seven million seeds of *Hevea*, mainly "clonal". *Aleurites.*—An account is given of work on selection, grafting, and the control of pests. *Fruit.*—Rough lemon is preferred to sour orange as rootstock for citrus, which grows and fruits well on alluvial soils. The report also deals with cotton and other fibres, food and forage crops, and livestock.

772. Kvithamar Research Station (Bremer, A. H., and others). 635.1/7(481)
Melding frå Statens forsøksgard i grønsakdyrking Kvithamar i Stjørdal. 25. Arbeidsåret 1944. **(Twenty-fifth Annual Report of the Vegetable Research Station, Kvithamar, Norway, for 1944)**, 1946, pp. 59, bibl. 127.

The information is given under 6 main heads. (1) On the occasion of this 25th anniversary report of the Kvithamar Vegetable Research Station a list of publications from 1919 to 1944 is compiled, preceded by a list of 18 publications of the Vegetable Research Station, Berg, Asker, during the period 1911-19. (2) Turnips. (3) Celeriac variety trials. (4) Optimum nitrogen applications to cabbage: Highest yields were obtained with applications of 35 kg. nitrogen per 1,000 m², 20-23 kg. being considered profitable. (5) Bean growing in the coastal area and in the north: Runner beans, as a rule, yielded well if sown in frames and planted out one month later, or sown in the open in double drills between two ridges and covered with lights. The date for sowing in drills was 8 June. Dwarf beans were a success if sown in deep furrows and covered with wax paper. (6) Winter cabbage growing.

773. Kvithamar Research Station (Bremer, A. H., and others). 635.1/7(481)
Melding frå Statens forøksgard i grønsakdyrking, Kvithamar i Stjørdal. 26. Arbeidsåret 1945. Kvithamar 10 år som forsøksgard 1936-1945. **(Twenty-sixth Annual Report of the Vegetable Research Station Kvithamar, Norway, for 1945. The Kvithamar Research Station during the 10-year period 1936-1945.)** [English summary of the Annual Report 2 pp.], 1947, pp. 60, bibl. 12.

In the 10-year survey of the station's activities yield figures and some other data are given for a number of vegetables. The emphasis is on leeks, where a relationship between leaf colour on the one hand and flavour and frost hardiness on the other is shown. Sowing in February and pricking out into hotbeds increased yields by about one-third as compared with plants sown 3-4 weeks later in accordance with the usual practice. The 26th Annual Report is devoted to an account of manurial trials, especially of liming in conjunction with boron applications. On the soil used limestone applications up to 2,000 kg. per 1,000 m² had little influence on the pH value. With carrots and garden beets liming caused cracking of the roots, which was partly controlled by the addition of boron. Also peat reduced the detrimental effect of lime without affecting the pH of the soil. Leeks were found to thrive better on artificial fertilizers than on farmyard manure, probably because the latter did not fully meet the nitrogen requirements of the crop. The numerous tables, which include data on plant composition following various manurial treatments, bear English captions.

774. LAUSANNE. 634/635(494)
Rapport d'activité 1946 des Stations fédérales d'essais viticoles, arboricoles et de chimie agricole, à Lausanne et à Pully. (**Annual Report of the Lausanne Horticultural Research Station 1946.**) Lausanne, 1947, being reprinted from *Ann. agric. Suisse*, 1946, pp. 701-92.

A new Division of Frost Control has been instituted; and a new fruit sub-station has been acquired at Conthey-Sion, in Valais. The results of part of the research recorded in this report had previously been published, and have already been noted in *Horticultural Abstracts. Physiology and Mycology.* Trials are reported on the control of several diseases of the vine, diseases of apple, and leaf spot, *Septoria apii*, of celery. Some work has been devoted to the failure of vine grafts. Growth substances were used to reduce fruit fall of cherry (Noire de Chavannes) and of apple (Beauty of Bath). α-naphthaleneacetic acid, its sodium salt, and Roche 202 were effective; flower and foliage buds on treated trees opened later than those on the controls in the spring following application. *Entomology.* Commercial preparations of hexachlorocyclohexane were less effective than DDT in controlling cochylis and eudemis; the persistent odour of this new insecticide rules out its use for grapes. *Oenology and Bacteriology.* These sections deal with the problems of making wine and grape juice. *Genetics.* The germination of pollen has been studied. The following growth substances failed to induce fruit set on Chasselas and S7053: α-naphthaleneacetic acid, its amide, 2,4-D, 2,-methyl-4-chlorophenoxyacetic acid, and Roche 202; no secondary effect was observed. *Viticulture.* Wine-making grapes are being studied. *Fruit growing.* Comparative studies of peach rootstocks are reported; Brompton and Pershore have produced the most vigorous trees. Similar studies are reported, involving six apple varieties on M. I, II, IX, XII and XIII. *Frost control.* The Californian orchard heater is too expensive; to overcome this and other defects, modifications are suggested. The Parrenin automatic smoke producer, using tar and naphthalene, is being tested. *Fungicides and insecticides.* This section has investigated the sticking and persistence of certain sprays of copper and sulphur. It also tests new commercial products and authorizes their release. *Fodder and weed control.* Various weed killers, including some based on growth substances, have been tested. *Physiological chemistry.* In the study of mineral deficiencies of vines and fruit trees Roach's injection technique is being used. The storage of grapes and pears is being investigated.

775. NEBRASKA. 633/635(782)
Sixtieth Annual Report of Nebraska Agricultural Experiment Station, 1946, 1947, pp. 103.

Pages 34-40 are devoted to horticultural crops. *Potatoes:* Investigations on the ascorbic acid content of tubers showed that this varied with the place where the crop was grown, the maturity of the tubers and length of storage. Losses of ascorbic acid from tubers stored at seven constant temperatures between 40° and 90° F. were least at 50°, very slightly greater at 60°, increasing further at 75° and 90°. Losses were increasingly greater with each drop of 2½° F. from 50° to 40°. Losses at 90° were not so great as at 45°. Ascorbic acid was lost rapidly when tubers were transferred to 40° F. from 50°, 60°, 75° or 90°. The successful use of the methyl ester of α-naphthaleneacetic acid for retarding the sprouting of potatoes in storage is reported. Two new and promising potato varieties, Nebraska 2 and 3, are briefly described. There is reason to believe that varieties with high ascorbic acid content can be developed. The tenth successive annual record of the rate of production of Triumph potatoes showed that 75% or more of the tubers were produced prior to mid-September in 8 of the 10 years. *Sweet potatoes:* These did well in yield tests:—Red Bermuda (262 cwt. per acre), Florida White, N. Carolina No. 1 and Maryland Golden. *Peas:* In a test of 52 varieties these appeared the most promising:—first early—Alaska, Surpass, Early Harvest; second early—Early Badger, Little Marvel, Glacier; main season—American Wonder, Pride, Climax, Canner King, Perfection; late—Merit, Major. *Lima beans:* Peerless was the most desirable variety tested for yield and quality. *Orchard spraying:* The results of trials with 2,4-D, α-naphthaleneacetic acid, Carbowax 1500, Fermate and Nugreen are reported. *Rootstocks:* Some results of top-working investigations are given. At present, only Hibernal and Virginia Crab are being topworked in Nebraska orchards. A trial was laid down to test the following stocks: Beacon, Cortland, Red Duchess, Fireside, Haralson, Hibernal, Hawkeye, Malling I, II, XII, XIII and XVI, Minjon, Prairie Spy, Rescue, Secor, Sharon, Turley, Virginia Crab and Wealthy.

776. NEW ZEALAND. 634/635+664.84/85(931)
Annual Report of New Zealand Department of Agriculture for 1946-47, 1947, pp. 76, 1s. 6d.

The report of the Horticultural Division appears on pp. 67-73. The total number of orchards registered was 4,813, a decrease of 243 from the preceding year, and the total area devoted to pip, stone and citrus fruits, for commercial production, nearly 18,000 acres divided into: apples 10,000 acres, pears 1,100, stone fruits 4,800, lemons 850, other citrus 1,000, other tree fruits 170. The quantity of fruit produced in 1946-47, an unfavourable season, was: apples 1,840,000 bushel cases, pears 278,000, stone fruits 396,000 bushels, citrus fruits 192,000 bushels, small fruits 1,300 tons. The average economic orchard unit is approximately 12 acres. A disturbing feature of the fruit industry is the continued shortage of all varieties of fruit trees for planting. The area under small fruits is increasing. A preliminary survey of raspberry varieties was undertaken to locate the heaviest-cropping strains for propagation and extended plantings. *Viticulture:* The production of grapes under glass is estimated at 600,000 lb. The area under wine grapes is given as 800 acres and the production, steadily increasing, approximately 389,000 gallons, mostly of the sweet red and sweet white types. A further 79,000 gal. (estimated) of wine is made from fruit other than grapes. *Vegetable production:* In 1945-46 there were 2,850 registered commercial producing areas representing 20,000 acres, of which 650 were under glass. *Bulb growing industry:* an endeavour was made to increase the variety and quantity of bulbs grown for export and local use. *Tobacco:* The area grown increased to 3,400 acres and the quantity of tobacco sold to 4,080,000 lb. approximately. *Hops:* The production fell to 1,800 bales from 3,100 in 1945. The incidence of blackroot in hop-gardens is reported. *Plant nurseries:* 752 were registered, an increase of 92. Particular attention was paid to the inspection of nurseries raising fruit trees and stocks. *Diseases and pests:* Notes on the incidence of those attacking horticultural crops is given. *A new station:* Plans were advanced for establishing a horticultural experimental station near Levin for work on the more urgent horticultural and market-garden problems.

777. NORTHERN RHODESIA. 633.71(689.4)
Annual Report of Department of Agriculture of Northern Rhodesia for 1946, 1947, pp. 16.

Tobacco. At Msekera Tobacco Station near Fort Jameson, opened in 1931, continuous cropping on fertile red loam, with half the land under tobacco, has been found possible by following the rotation: tobacco, tobacco, sunnhemp and maize. The tobacco plots receive annually 150-200 lb. of a complete fertilizer. " In the station trials of the 6 introduced varieties, Willow Leaf and White Stem Orinoco made the best showing with Yellow Mammoth a good third." Bonanza gave the highest percentage of " brights " on the new lands and White Stem Orinoco on the old. The most popular varieties in the Fort Jameson district are now Bonanza, White Stem Orinoco and Willow Leaf. The flue-cured Virginia crop amounted to 2,823,000 lb. in the

eastern area and 307,000 lb. in the west, the yield being about 500 lb. per acre in both areas. Turkish tobacco production continued to expand in the western area, the amount consigned by the end of the year being a million lb. approx.

778. DIRECTOR OF AGRICULTURE, NORWAY. 633/635(481)
Hagebruket. Meldinger frå Statens hagebruksskoler og Statens forsøksstasjoner i hagebruk for året 1940. **(Horticulture. Reports of Norwegian horticultural State Colleges and research stations for 1940.)**
being Supplement G of A.R. Dir. Agric. Oslo, 1940, 1941, pp. 20+18 [received 1947].
The first part contains reports of the following State horticultural colleges: Oslo, Staup, Dømmesmoen, Vea, Hjeltnes; and part two the report of the Kvithamar Research Station for 1940, which also appeared as a separate publication [noted 789c].

779. DIRECTOR OF AGRICULTURE, NORWAY. 633/635(481)
Meldinger frå Statens forsøksstasjoner i plantekultur for året 1941. **(Reports of Government plant research stations in Norway for the year 1941.)**
being Supplement H of A.R. Dir. Agric. Oslo, 1941, 1943, pp. 247 [received 1947].
Contains a summary of experiments on cabbage fly control, carried out from 1936 to 1941 (4 pp.).

780. ONTARIO DEPARTMENT OF AGRICULTURE [VINELAND]. 634/635
Report of the Horticultural Experiment Station Vineland for 1945 and 1946, 1947, pp. 67.
The main feature of this report is a paper entitled Quantity and quality of fruit, fresh and processed, as affected by stage of maturity at picking time (W. H. Upshall and J. R. van Haarlem). During the last week before optimum maturity most fruits increased in weight, from 3% in Italian prunes to 35% in Golden Jubilee peaches; in some varieties there was little colour change; sugar contents increased; peaches, and Bartlett pears softened quickly enough to allow the use of a pressure test to determine maturity; eating quality improved in fresh and canned fruits. Experimental shipments of peaches and plums are fully reported. Breeding *Rubus* spp. continues. Three varieties of tomato, Vetomold, V-121, and V-473, are described; they are derived from crosses between *Lycopersicon pimpinellifolium* and *L. esculentum*, and are immune or resistant to certain strains of *Cladosporium fulvum*.

781. PALESTINE. 634.1/3+635.9(569.4)
Annual Report of Department of Agriculture and Fisheries, Palestine, for 1945-46, 1947, pp. 48, 50 mils.
This report, which is more comprehensive than in recent years, opens with a statement of policy. The year was a satisfactory one on the whole, from the farmer's point of view. *Citrus:* The total area under citrus was approximately 65,000 acres, 31,850 Jewish-owned and 33,340 owned by Arabs and others. The total export of citrus fruit in cases and bulk was equivalent to 5,382,000 cases of an estimated value of £P.3,496,000. The top-working of groves continued, chiefly of Shamouti oranges and grapefruit to varieties in demand for local consumption, e.g. Valencia oranges and Clementines. Investigations into citrus wastage in storage and transit are reported. The great value of diphenyl wraps in reducing wastage from blue and green moulds is recorded. *Fruits other than citrus:* There was a steady extension of planting, Arab growers concentrating on olives, vines and figs while Jews showed more interest in pome fruits and plums. High nursery costs tended to limit new plantings. *Vegetables:* A further rapid development of vegetable growing is anticipated when increased supplies of irrigation equipment become available and the local seed production industry becomes more efficient. *Potatoes:* These continue to be one of the most important crops in intensive farming. The erection of cold stores has contributed largely to the progress made by the industry. *Floriculture:* Climate and soil are ideal for the cut-flower and flower-seed trades. Renewed interest was shown in future possibilities.
In Section II of the report a condensed account is given of the work of the agricultural, horticultural and plant protection services. There is an extremely short outline of experimental work and results.

782. PENNSYLVANIA. 633/635(748)
Sixtieth Annual Report of Pennsylvania Agricultural Experiment Station 1946-47, being *Bull.* **488** (Science for the Farmer), pp. 57.
A mixed bag from which the following items are selected: *Orcharding.* Ladino clover and crown vetch proved promising as cover crops for apple orchards. Malling XII and XV rootstocks have proved satisfactory in apple trials, making trees approaching standard size. Malling XVI is the most generally compatible dwarfing type while Malling II has been especially good as a stock for Rome Beauty and Cortland. Mazzard cherries which appear resistant to leaf spot disease are reported. Glyoxalidine 341, a new spray preparation, was used with continued success against this disease. Cryolite, DDT, or a reduced dosage of lead arsenate combined with phenothiazine proved effective controls for cherry fruit flies. DDT appears to be excellent for controlling insect pests of grapes. *Vegetables.* The F_1 tomato hybrid, Rutgers × Pritchard (named Keystone) gave an average of 4·7 tons per acre more than Rutgers. Two canning companies are producing their own seed of this hybrid. Two new varieties of head lettuce, Early Great Lakes and Pennlake, are announced. DDT compounds applied to soil surfaces and washed in, or mixed with potting soil, were of value in controlling the greenhouse symphilid or garden centipede. *Flowers.* Tests show that many strains of annuals fail to attain their pre-war quality. Progress was made in breeding proliferated snapdragons. Azobenzene gave good kills of red spider on roses but has a tendency to bleach the buds.

783. ROYAL HORTICULTURAL SOCIETY. 634.1/8(42)
The fruit year book, 1947 R.H.S., Vincent Square, London, S.W.1, 1947, pp. 108, 8s. 6d.
This, the first publication of the newly formed fruit group of the R.H.S., should have the strongest appeal to the amateur fruitgrower. Its lively articles, copiously illustrated, on subjects of immediate interest will act as a stimulus to an already keen section of horticulturists, who will undoubtedly cry for more. [For notes of many of the papers, see separate abstracts.]

784. EASTHAM, A., AND BRETT, C. C. 631.531
The Official Seed Testing Station for England and Wales, twenty-third to twenty-seventh annual reports, 1939-44.
J. nat. Inst. agric. Bot., 1947, **5**: 228-45.
Because of the great increase in routine work it was found necessary to restrict investigations to the day to day problems arising during seed analysis. A total of 75,834 samples was received for examination in 1943-44 compared with 35,634 samples in 1938-39.

785. GAVIN, W. 631.531: 633/635
Third and fourth reports of the Seed Production Committee, 1944-46.
J. nat. Inst. agric. Bot., 1947, **5**: 197-227.
These describe the developments of a very important industry in home-grown seeds, and indicate the measures taken by the committee to safeguard the quality and quantity of seeds produced in Britain.

786. SOUTHERN RHODESIA DEPARTMENT OF AGRICULTURE. 633.71(689.1)-2.4
Annual Report of the branch of Botany and Plant Pathology, Dep. Agric. S. Rhodesia, for the year ending December 31st 1946, pp. 13 (stencilled).
Included under the heading Research are brief descriptions of three tobacco diseases, viz. barn rot (a physiological disease of the curing leaf with *Rhizopus arrhizus* as secondary to autolytic cell breakdown), bacterial wilt (presumably Granville wilt caused by *Xanthomonas solanacearum*), and brown spot (*Alternaria longipes*).

787. SECRETARY OF AGRICULTURE U.S. 63(73)
Report of the Secretary of Agriculture, U.S., 1946.
U.S. Govt. Printing Office, Washington, 1946, pp. 174, 30 cents, received 1947.
Very brief surveys of the economic position in many fields of agricultural activity.

788. ZÜRICH-ÖERLIKON (KOBLET, R.) 633.491(494)
Bericht über die Tätigkeit der Eidg. landwirtschaftlichen Versuchsanstalt Zürich-Öerlikon für die Jahre 1942-1946. **(Report of the Swiss Agricultural Research Station, Zürich-Oerlikon, for 1942-1946.)**
Landw. Jb. Schweiz, 1947, **61**: 121-224, bibl. 62.
Of crops discussed only the potato is of interest to this Bureau. The production of virus-free seed potatoes was attempted at high altitudes (two centres 1,800 and 1,900 m. respectively) but failed to give a disease-free progeny. Two reasons are given for this failure: (1) In spite of careful selection the tubers were not initially virus-free; (2) in the hot summer of 1945 aphid infestation was severe even in the Alps. Wart disease was reported from 10 villages in 1943, but control measures reduced the number of occurrences later. Virulent *Rhizoctonia solani* attacks were found in potato fields on ploughed-up pasture. A few samples from higher altitudes showed powdery scab caused by *Spongospora subterranea*; common scab was frequent only in imported material. The difficult seed potato position resulting from the war is reflected in the increase of virus-infected tubers from 6·4% in 1943 to 34·7% in 1946. Yields were so far not appreciably affected by heavy infestations of Colorado beetle which occurred especially in western Switzerland. Although calcium arsenate and DDT are widely used, in some districts compulsorily, control relies chiefly on the collection of the beetles and larvae in the field. In 1946 white grub infestation caused disastrous losses in central Switzerland.

789. The following also have been examined:

a *National Research Council [of Canada] Review for 1946,* 1947, being N.R.C. **1641**, pp. 146, 75 cents.

b *Twentieth A.R. Northern Ireland agric. Res. Inst. Hillsborough, 1946-47,* 1947, pp. 32.

c KVITHAMAR RESEARCH STATION (BREMER, A. H., AND OTHERS).
Melding frå Statens forskøsgard i grønsakdyrking, Kvithamar i Stjørdal. 20 og 21. Arbeidsåret 1939 og 1940. **(Twentieth and twenty-first Annual Report of the Vegetable Research Station, Kvithamar, Norway, for 1939 and 1940),** 1941, pp. 62, bibl. 9 [received 1947].

d KVITHAMAR RESEARCH STATION (BREMER, A. H.).
Melding frå Statens forsøksgard i grønsakdyrking, Kvithamar i Stjørdal. 21 Arbeidsåret 1940. II. **(Twenty-first Annual Report of the Vegetable Research Station Kvithamar, Norway, for 1940, II),** 1941, pp. 18 [received 1945].
Deals with sources of vitamin C in Norwegian vegetables.

e *67th A.R. N. Jer. agric. Exp. Stat. for 1945-46* (Science and the land), pp. 109.
Written in the form of very simple question and answer.

f ROYAL METEOROLOGICAL SOCIETY (GUNTON, H. C.).
56th Phenological Report 1946.
Suppl. Quart. J. roy. Met. Soc. **73**, 1947, pp. PR 31.